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CONTENTS.

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT.

AN ADDRESS on Some Heart Problems. Delivered before the Hunterian Society. By ERNEST H. STARLING, C.M.G., M.D..... 1199

CHADWICK LECTURE on Dietetics and Public Health. By Prof. E. C. VAN LEERSUM, M.D.... 1252

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MEDICAL SOCIETIES.

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ANNOTATIONS.

Opium and the League of Nations 1230

Schools of Public Health in the United States... 1231

Epidermoid Cysts 1231

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CORRESPONDENCE.

Generalia on the Louse Problem on the Western Front (Dr. M. Coplans) 1244

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Occupational Therapy in Heart Disease (Dr. Charles W. Chapman).. 1247

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Cynotherapy (Dr. Edgar J. Tyrrell) 1255

A Disclaimer (Dr. George N. Biggs) 1256

Successful Quackery (Mr. F. A. Parker)..... 1256

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Royal Naval Medical Services.—Royal Army Medical Corps.—Royal Air Force 1248

OBITUARY.

Thomas Gambier, M.D... 1248

William Henry Haden-Haden, M.D. 1248

William Gordon Woodrow Sanders, M.D., F.R.C.P. 1249

The late Prof. Peter Thompson 1249

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An Address
ON SOME
HEART PROBLEMS.

Delivered before the Hunterian Society on Oct. 26th, 1921,

BY ERNEST H. STARLING, C.M.G., M.D. LOND.,
PROFESSOR OF PHYSIOLOGY, UNIVERSITY COLLEGE, LONDON.

IN this paper I propose to discuss some questions, connected with the behaviour of the heart in disease of this organ, which have interested me ever since I was house physician. At that time the account given by Cohnheim, based on an experimental study of the problem, was insufficient to explain the various phenomena observed in the wards. My earliest work, therefore, when I obtained the run of a laboratory, was on the heart, and though I have diverged into other fields of investigation, the questions which intrigued me at that time have always retained their fascination, so that I have returned again and again to their investigation. I cannot even now claim to have cleared up the questions which seemed so difficult to answer, and this evening I can only deal with a few of the points which have been eliminated by the investigations of the last 30 years.

THE MARGIN OF ADAPTATION.

Why the heart fails, and how it fails, are problems which must come before us in every disease, not only in those primarily affecting this organ itself: since, in the end, death is due to failure of the circulation, and we mark the point of its occurrence by the moment at which the heart ceases to beat. In heart disease we have a condition in which cardiac inadequacy may continue for a long time. This inadequacy may mean simply a diminution of the margin of response, so that life may continue more or less normal so long as all effort or other condition is avoided, which would throw increased strain on the heart. In nearly every function of the body in the healthy individual there is a margin of adaptation of about 1000 per cent.—i.e., the organ can, working at its utmost, perform ten times as much work, chemical or physical, as is demanded of it during a condition of rest. If this margin is diminished to 500 or 300 per cent., we may speak of a cardiac inadequacy, although, leading a sheltered existence, the individual may remain healthy and all his functions may go on unimpaired. But it is when the margin is diminished below this point, or when it is impossible to preserve an individual from such shocks and strains as call up more than this margin of adaptation, that we get a condition of cardiac insufficiency which we may speak of as heart disease. This insufficiency may be due to gross lesions of the valves, so that the pump is leaky and more work is demanded of it to maintain the normal flow, but in almost every case there is also some disorder of the muscular tissue itself. This disorder may be localised in one part of the heart or may affect the whole musculature. We know that the function of the heart is to pump blood from the venous side, where it enters at a low pressure, into the arteries, and to maintain in the matter a pressure sufficient to provide blood for all parts of the body in proportion to their working requirements. The fraction of the total output of the heart which goes to each tissue is regulated chiefly by the vaso-motor system, though it is also affected by chemical changes in the tissues themselves. As a rule, when one organ or set of organs is working, blood for its needs is supplied at the expense of other parts of the body. Thus hard exercise is accompanied by a diminished flow to the alimentary canal, and when the alimentary canal is flushed with blood, the muscles are not capable of attaining their full activity. To every part of the body the supply of blood is a constantly varying quantity.

BLOOD SUPPLY OF THE BRAIN.

There is, however, one organ which can never go short, however much other tissues may cry out for blood, and that is the brain, the master-tissue of the body, on whose functioning depends the continued existence of all other parts. It has not been possible to prove the existence of a vaso-motor nerve supply to the vessels of the brain, nor is such a supply necessary, since this organ itself controls the blood flow through all the rest of the body and will rob every other part, if necessary, to maintain the flow through itself. The circulation through the brain is therefore dependent almost entirely on the maintenance of the normal blood pressure in the carotid and vertebral arteries. This pressure cannot be diminished without affecting the functions of the master-organ, and we may be certain that every other organ may suffer, including the heart itself, before the brain will allow the arterial blood pressure to drop below the limit at which it can receive a supply of oxygen adequate for its needs. Thus when there is loss of blood, there is a constriction, through the vaso-motor centre, of all the vessels of the body, cutting off blood supply to the skin, intestines, and muscles. There is a lowering of the venous pressure, the heart beats more quickly so that as much as possible of the blood may be passed into the carotid artery to maintain here a normal arterial pressure. If the flow of blood or the supply of oxygen to the brain is diminished, as by ligature of the carotids or by cutting off the supply of oxygen to the lungs, there is again universal vascular constriction so as to raise the pressure in the circle of Willis and vertebral arteries, and to make up by increased velocity of blood for its diminished oxygen content. The same vaso-constriction follows local anæmia of the vaso-motor centre in the brain, such as may be produced by a rise in intracranial pressure.

DIMINISHED OUTPUT OF THE HEART AN ESSENTIAL FACTOR.

Cohnheim, in his investigation of heart failure, argued that any inadequacy of the heart pump must cause a fall of arterial pressure and a rise of venous pressure on account of the diminished output, and was confirmed in his conclusions by experiments in which he tried to imitate the conditions in failure of compensation by gradually filling up the pericardium with fluid, so as to hinder more and more the diastolic expansion of the heart. These experiments, however, put us on a false track. I have already pointed out that in the intact animal the last factor in the circulation to suffer must be the general arterial pressure, since it is on this that depends the flow through the brain. It is surprising how many years we had to wait after Cohnheim's investigation for any actual determination of the blood pressures in heart disease, and I believe the first of this kind were those carried out by my brother, H. J. Starling, in 1906. He pointed out that in no case of ordinary heart disease is the arterial blood pressure found below the normal, though in a considerable number the pressure may be above normal. This is especially the case if the condition is attended with cyanosis, so that the vaso-motor centre is in a partial condition of asphyxia. In general conditions, where for some reason there was a high blood pressure before the onset of cardiac inadequacy, this high blood pressure continues. There is, however, one physical factor in the circulation which is defective. In spite of the normal or high arterial pressure there are very often cyanosis without any corresponding defect in the entry of air to the alveoli, distended veins, and signs of inadequate circulation through all parts of the body except the brain itself. Direct measurement has shown that there is in fact a defective circulation, that the heart at each beat and in each unit of time is putting out less blood than normally. The essential factor, therefore, in heart disease is diminished output of the heart.

Can we form any idea as to how this state of things is brought about? We shall be helped to its under-

standing by a study of the isolated heart, provided that we remember that it is the isolated heart that we are studying and do not imagine that the results obtained thereby will suffice by themselves to explain the phenomena met with in the complex vascular system with its multifarious relationships, nervous and otherwise, in the body. In physiology we analyse each complex function into its constituent parts in order that we may synthesise them again later and understand the function as a whole. Physiology may become a dangerous guide in clinical medicine if we forget this process of synthesis and try to explain any complex morbid condition with our eyes directed only on one or two of the factors involved.

ACTION OF THE ISOLATED HEART.

With this caution in mind, we may learn something from the behaviour of the isolated heart. We can make a preparation of the mammalian heart and lungs entirely separated from the rest of the body, so that the heart is cut off from all nervous influences and is simply a muscular pump causing a flow of blood through an elastic system of tubes. In this case the only variable factor is the muscular wall of the heart. All the other conditions—the amount of blood entering the heart, the resistance to the flow of blood from the heart, the arterial pressure, the temperature at which the heart works—are directly subject to our control, and can, if we so desire, be maintained constant. And we can measure the pressures in any of the cavities of the heart, the total amount of blood put out by the heart, as well as changes in the systolic and diastolic volume of this organ. In studying the heart under these conditions, we are at once struck by the perfection of its mechanism. The heart of a dog, released from the vagus control to which it is normally subjected in the body, beats at about 140 per minute. The rate of this beat is unaltered by any mechanical conditions, and is simply a function of the temperature of the pace-maker in the right auricle, and therefore can be modified at will by altering the temperature of the blood entering the heart. If we increase the amount of blood entering the heart by raising the venous reservoir or by relaxing the screw clip on the wide tube passing to the right auricle, the heart sends out a correspondingly increased amount of blood into the pulmonary artery and into the aorta. If we maintain the inflow constant and alter the arterial resistance, we find that the heart still maintains its output unchanged, although the arterial pressure, and therewith the work thrown on the heart, may be increased from 50 mm. Hg to 250 mm. Hg. There is, of course, a limit to this power of adaptation possessed by the heart. If either the inflow or the arterial resistance is increased too much, the blood may accumulate in the heart cavities, the diastolic pressure rises, and the output falls off. This limit depends in the first place on the pericardium, and may be raised by opening the pericardium, when the distended heart is found to give a maximum output greater than when it is confined by the pericardium. The enormous work at the highest limits of capacity of the heart is only performed at the expense of the heart muscle, and one finds hæmorrhages in the heart muscle due to rupture of its fibres after it has been made to work at this maximum power during 10 or 20 minutes.

MECHANISM OF ADAPTATION.

I have shown that this power of adaptation possessed by the isolated heart is determined by a very simple law—namely, the relationship between the length of the heart muscle and the force of its contraction. In any given heart, the greater the length of its muscle—i.e., the greater the dilatation of the heart—the stronger is the contraction. Thus if the work presented to the heart is suddenly increased, the heart fails for a time and therefore gradually dilates. But with each dilatation its contraction becomes stronger, so that finally the heart is putting out as much blood as before but with a greater systolic and diastolic volume. With a constant inflow the physiological condition of the heart, its contractile power, is measured by its diastolic size. A heart in good condition contracts strongly with only a small diastolic distension, so that it practically empties itself of blood at each systole. As its physiological condition deteriorates, its fibres have to be longer to exert the same force during contraction. We therefore find that the heart dilates, and though it is sending out at each beat as much blood as before, there is a considerable amount of residual blood in the heart at the end of each contraction. We speak of the heart in the first condition as one with "good tone," and the second condition as "bad tone." Thus, if we keep the mechanical conditions of an experiment on the isolated heart constant, the heart will gradually get larger as it becomes tired, but there will be no signs of failure of the circulation, the output and the arterial pressure remaining constant.

Let us suppose that a well-trained athlete starts to run. Even before he starts there will be a central preparation for the exercise, which will be shown by a quickened respiration and a rise of blood pressure. As soon as he begins his course the pumping movements of the muscles of limbs and respiration will largely increase the inflow of blood into the right heart. The heart will react to this in two ways. In the first place it will dilate, and by this means will give a stronger contraction and send out on the arterial side the whole of the blood that it receives. Other things being equal, the increased diastolic filling will cause some rise of pressure on the venous side of the heart, and as a result there will be reflex inhibition of the vagus control, with probably some stimulation of the accelerator nerves, and a quickened pulse beat. The heart reacts therefore to exercise by increased output per beat and by increased rate of beat. We find these two factors taking a varying part in the adaptation to exercise in different individuals. In the well-trained man the increased output per beat may be more marked than the rise in pulse-rate. In the untrained individual—i.e., in an individual whose heart has probably a poor tone and a larger residual quantity of blood at the end of each beat—it is the quickening of the pulse-rate which is more evident. Finally, however, the heart may be putting out three times as much blood at each beat and contracting at a rate two and a half times normal, so that the total output per minute may be increased seven or eight times. Since under these conditions there is a somewhat more effective utilisation of the oxygen carried by the blood, the heart is able to supply the ten-fold increase in oxygen which is required by the contracting muscles.

EFFECT OF FATIGUE.

These conditions cannot, however, endure indefinitely; the heart muscle working at eight times its normal rate tires. The phenomena of fatigue can be studied in the heart-lung preparation. Fatigue means diminution of physiological efficiency—i.e., the heart, in order to produce a given rise of pressure at its contraction in its interior, must start from a more dilated condition than when it is fresh. But a heart at its maximum efficiency is dilating at each diastole to the limits set by the indistensible pericardium. It cannot then dilate more during diastole. The effect of fatigue, therefore, is simply to reduce the output of the heart. This may be felt in various ways. If it affects all parts of the heart, the insufficient supply to the muscles causes muscular weakness and incoördination. If it affects chiefly the right side, there may be signs of anoxæmia, such as headache and vomiting, as well as muscular weakness. The man is forced finally to give up running through fatigue, but the fatigue in this case is almost entirely failure of the circulation by failure of the heart. We see therefore that in this muscular fatigue, the output of the heart, though increased above the resting amount, is insufficient for the needs of the body. In the diseased heart, the muscle is inadequate for the normal needs of the body. A healthy heart deprived of its pericardium will react to

such an extent by increased dilatation that it tears its own structure in its effort to cope with the increased load thrown upon it, and post mortem one finds the heart muscle studded with small hæmorrhages. In the body this over-distension is prevented by the pericardium, and possibly in some hearts the physiological process of adaptation by dilatation may be limited by the fibrous character of the myocardium. But in each case the cardiac inadequacy will reveal itself by a diminished output, to which the central nervous system, in its selfish activity, will respond by shutting off the blood supply to the various organs of the body, so that the greater part of the output can be diverted to the brain and an adequate pressure maintained in the carotid and vertebral arteries. In this condition the main arterial trunks will be normally distended. The peripheral vessels, capillaries, and veins will be depleted of blood, as shown by the pallor of the skin, while there will be a certain amount of distension of the auricles and great veins near the heart.

But the process does not end here. The lowered capillary pressure and diminished flow through the tissues at first cause increased absorption of fluid from the tissues, especially from the alimentary canal, associated with diminished urinary secretion. The result of these factors is to increase the amount of fluid in the circulation, causing a condition of hydræmic plethora, which, in the presence of cyanosis and the consequent stimulation of the bone marrow, may be converted into a real plethora, a new formation of red corpuscles keeping pace with the increased volume of the blood flow. The venous system and capillaries thus fill up to their normal pressure, the arterial trunks remaining as full as before. This increased filling of the veins tends to produce a further rise of diastolic pressure, but cannot cause any further dilatation of the heart except by a gradual giving way of the pericardium, and therefore will not evoke any stronger contraction of the cardiac muscle. The increased venous pressure may cause, reflexly, a still further acceleration of the pulse; but it will not be indefinite, since, as Bolton has shown, the veins tend to give to the increased pressure in their interior, so that one finds them distended although the pressure in them is only a few millimetres of water above normal. Under these extreme conditions, too, the rate of the heart will depend not only on the reflex acceleration through rise of auricular pressure, but to a still larger extent on the central excitation of the cardio-inhibitory or cardio-acceleratory mechanism dependent on the state of the brain itself, fall of blood pressure in the cranium tending to cause acceleration, while other physiological conditions may excite the vagus centre and diminish the rate of the heart, so that it is difficult in any given case to prophesy what will be the resultant rate of the heart.

Even though the heart dilates and quickens, the sparing of this muscle is the office of the central nervous system, and this maintains the arterioles constricted, so that the amount of blood coming into the venous system and into the heart is less than normal, and the heart remains at just that stage of dilatation at which it can empty a diminished amount of blood into the arteries against a normal arterial pressure. As a rule, however, this adaptation affords only an imperfect protection for the diseased organ, since it calls into being other morbid states which have a secondary influence on the heart muscle and tend to make its condition worse. The muscular weakness we may regard as protective, since it is the muscular contractions which are the main factor in determining the inflow of blood into the heart. The diminished flow through the lungs, however, causes deficient oxygenation of the blood, which reacts unfavourably on the functional capacity of the heart muscle. The functions of the alimentary canal are interfered with, thus retarding nutrition; the functions of the kidneys are diminished, so that excretion of waste products is imperfectly carried out. The whole venous and capillary system gradually fills up with stagnant badly oxygenated blood, and as a result there is deficient nutrition of the capillary wall with increased exudation of lymph and the production of dropsy in all the dependent parts of the body. In the upright position it must be remembered that the main factor in maintaining the venous flow towards the heart consists of the contractions of the voluntary muscles, so that the capillary pressure normally in the feet is not higher than that in the hand. If these movements are absent, the capillary pressure rises in all dependent parts by the amount of hydrostatic pressure represented by the height of the heart above the part; this fact in itself is sufficient to account for the gradually increased transudation of fluid.

Thus the law of the heart, which expresses so perfect an adaptation of this organ under healthy conditions and with intact muscle fibre, is limited under extreme conditions in the normal individual and under ordinary conditions in the diseased individual by three factors. Two of these consist in a mechanical limitation of the dilatation which may evoke increased energy of contraction, and are in the first place the pericardium, and in the second place (in disease) inextensibility of the myocardium in consequence of development of fibrous and scar tissue in its interstices. In the third place, a continuous and indefinite rise of diastolic pressure is prevented by the gradual dilatation of the large veins to accommodate the excess of fluid which remains in them, and the diminished rate of flow of blood through the capillaries into the venous system.

I cannot pretend to have explained all the phenomena of uncompensated heart disease by the action of the few factors which I have discussed. I have shown that a consideration of the isolated heart-lung enables us to understand how heart failure, however brought about, must lead to a limitation of output, but it is hardly conceivable that the heart in situ, unable to respond to the demands made upon it, does not itself invoke the interaction of the central nervous system, which may be used either to increase the response of the heart muscle, as certainly occurs in the healthy individual, or possibly to save the muscle at the expense of other organs of the body, subject only to the demands of the brain itself, when the heart is in danger of failing through excessive fatigue. It is possible, too, that other factors, such as retarded rate of relaxation, may serve to diminish the inflow into the tired heart. But of these factors we have very little knowledge, and the part to be assigned to each requires a profounder clinical knowledge of the failing heart than I can pretend to possess.

TREATMENT OF FAILURE OF COMPENSATION.

Although we cannot claim by our inquiry to have obtained a clear image of all the factors concerned in producing the clinical signs of failure of compensation, we are enabled to see the physiological reason for the efficacy of various measures employed in its treatment.

1. Most important is rest, which not only diminishes the demands on the heart from the arterial side, but by removing the main cause for the return of the blood to the heart enormously decreases the inflow into this organ; and it is inflow which in the healthy heart determines output.

2. The value of oxygen, when there is any cyanosis, is explained by its action in diminishing the blood pressure necessary to drive a sufficient amount of blood through the brain, the relaxation of arterioles, and the improved supply to the vital organs of the body, and the direct effect of a proper supply of oxygen in improving the contraction and aiding the reintegration and recovery from fatigue of the heart muscle.

3. The plethora attending failure of compensation is a reaction on the part of the organism as a whole, not on the part of the heart, and does not assist this latter organ. It may, in fact, be harmful when the heart is beginning to recover under the influence of the other modes of treatment just mentioned. One can therefore understand the beneficial effects of bleeding as a preliminary measure in certain cases of

failure of compensation, as well as the value of diminished salt intake.

4. Another factor of importance in enabling the heart muscle to recover its physiological condition is the circulation through the coronary vessels. In my earlier experiments on the isolated heart-lung preparation I used to put the arterial pressure low, in order—as I thought—to give the heart, under the abnormal conditions of experiment, as little work as possible to do. Many hearts, after the artificial circulation had been established, continued to fail and finally went into delirium or ceased to beat. One day, when the heart was obviously failing, I put up the pressure to 150 mm. Hg, thinking that I should kill the heart outright. Instead of this happening, the heart first dilated widely and beat more forcibly, but as it reacted to the pressure in the arterial system it steadily improved, and both its diastolic and systolic volumes diminished. It continued to beat against this high pressure for hours, so that on all subsequent occasions I have raised the arterial resistance to start with, so that the heart, as soon as it is connected with the artificial system of tubes, has to contract against a high resistance. In my early experiments the arterial pressure had been insufficient to furnish an adequate supply of blood through the coronaries to the heart muscle. As soon as this was supplied by a temporary rise of blood pressure, the heart muscle steadily improved and the heart was able to contract against an abnormally high resistance without undue dilatation, improvement in physiological condition being marked by diminished volume, or as would generally be stated, increased tone of this organ. I am inclined to ascribe the beneficial effects of graduated exercises in heart disease very largely to the improvement of the coronary circulation brought about by the temporary rise of arterial pressure accompanying the exercises. So important is the coronary circulation for the functional capacity of the heart that every medical man should be aware of the manner in which this circulation is regulated. The oxygen usage of the heart is directly proportioned to the work it does, and its oxygen supply must therefore vary within the same limits as its work—i.e., in a healthy heart from 1 to 7 or 10. The most important factor, as is shown by the accompanying table, in determining the amount of blood flowing

Dog, 11 kg.; weight of heart, 107 g.

	Time.	Arterial pressure, mm. Hg.	Rate of heart per min.	Total coronary output	Total output.	Output per heart beat, c.cm.	Venous pressure, cm. H_2O.
I.	12·5	84	150	40·80	851·80	5·72	9·6–12·4
	12·8	108	150	50·30	840·30	5·60	8·8–12·0
	12·12	140	150	70·75	840·75	5·60	8·0–11·2
	12·15	170	150	117·40	867·40	5·75	8·0–10·8
	12·18	208	150	260·30	860·30	5·72	12·0–22·0
	12·21	104	150	80·30	840·00	5·60	8·4–10·4
	12·27	104	150	80·30	830·00	5·55	8·0–10·0
	12·30	44	150	30·40	820·00	5·45	7·6–10·0
II.	12·34	60	150	50·30	1452·00	9·70	10·4–12·8
	12·38	100	150	50·30	1350·00	9·00	10·0–12·8
	12·41	128	150	124·90	1346·90	9·00	10·4–12·4
	12·45	166	144	208·00	1386·00	9·65	12·0–14·0
	12·50	190	144	500·00	1310·00	9·20	32·0–34·0

The venous inflow was increased between I. and II.

through the coronary arteries, and therefore the oxygen supply to the heart muscle, is the arterial pressure, so that as the resistance to the heart beat increases, there is a corresponding increase in the flow of blood through the heart muscle. Under extreme conditions of work the flow through the heart muscle may be greater than has been found in any other organ of the body and may amount to 5 c.cm. of blood per minute for every gramme of heart muscle. But the supply of blood and of oxygen is aided by two more circumstances. In the first place, as soon as increased strain is thrown on the heart, or this organ commences to fail, we find an augmented flow through the coronaries out of all proportion to the blood pressure in the aorta. This is not due to the accumulation of carbonic acid in the blood and must be determined by the formation of metabolites, of which lactic acid may be one, in the labouring muscle fibres. Moreover, the heart has an astounding power of utilisation of the oxygen in the blood. When an isolated heart is fed with blood from an asphyxiated animal, we find that the heart removes the last traces of oxygen from the blood, so that the blood from the coronary sinus does not contain one-half per cent. of oxygen. The enormous range of adjustment in the coronary circulation characteristic of the healthy heart enables us to form some idea of the evil results which must follow impairment of the power of adjustment, such as may occur in consequence of disease of the coronary arteries themselves. We may see how rapidly such a failure of adjustment may act on the heart muscle by repeating Cohnheim's experiment of ligature of one main branch of the coronaries. This is almost invariably followed, within a period varying from a couple of minutes to half an hour, by fibrillation of the ventricles and death of the animal, and a similar result may occur in man as a result of any unequal derangement in the powers of adjustment possessed by different parts of the coronary system.

ON THE FUNCTION OF THE LYMPHOCYTE AND OF LYMPHOID TISSUE IN NUTRITION,

WITH SPECIAL REFERENCE TO THE VITAMIN PROBLEM.

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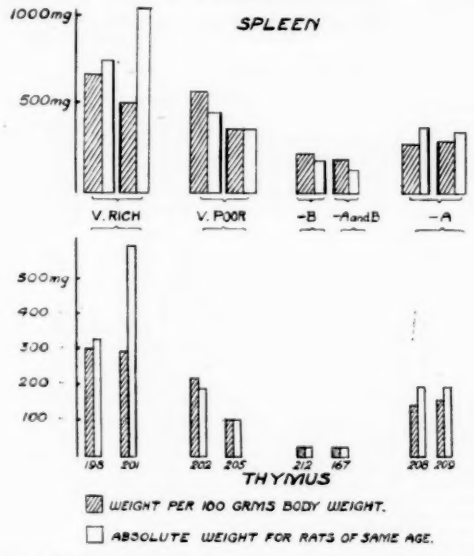
WHEN a rat is kept on a diet completely free from vitamins its growth is at first arrested, then its weight declines, its temperature falls, and eventually the animal dies in a state of complete emaciation. The ordinary white adipose tissue has completely disappeared. The glandular adipose tissue—the "brown fat"—is still present; but microscopic examination shows that most of the cells still contain very small droplets of fatty material, which are, however, much smaller than those found in a normal rat, and in some cells may be quite absent. There is a profound atrophy of the lymphoid tissue, which is obvious to the naked eye. This is most striking in the thymus, which is hardly visible. The Peyer's patches, which stand out very clearly in the intestine of a normal rat, are mostly not visible to the naked eye; after careful search a few can be detected here and there. The spleen is shrunk to a narrow ribbon (see Fig. 1, rat 167). The size of the lymphatic glands in the mesentery and in the groin underneath the skin exhibits such variations, even in normal animals, that it is difficult to appreciate differences in size in animals kept on a vitamin-free diet. Microscopic evidence shows that the lymphoid tissues are empty of lymphocytes. Not only is there a diminished production of lymphocytes in the spleen and lymph glands, but the disintegration of lymphocytes in these organs is also diminished as indicated by the infrequent occurrence of phagocytosis and the relative absence of cellular debris. This change in the lymphoid tissue is reflected in the blood. There is a diminution in the total number of lymphocytes; of these, the small lymphocytes are particularly diminished. This diminution may amount to 50 per cent. when the animal begins to show definite signs of suffering from the lack of vitamins, as indicated by its ruffled fur and by fall of temperature to about 36°, instead of 37°–38° given by a normal animal. In the final stages a fall in the number of lymphocytes from the average figure of 8000 per cmm. of the normal

animal to as low as 1200 has been observed. The polymorphonuclear leucocytes are not affected to the same extent. As a result a differential count gives figures in which the proportions are completely changed. In a normal rat the polymorphonuclear leucocytes constitute about 30 per cent. of the total leucocytes, representing in absolute figures about 2600 cells. As the condition resulting from the deficiency of vitamins progresses the relative proportion of the polymorphs increases, so that in the later stages they may equal in number the lymphocytes and even exceed them (see Fig. 2, rats 161 and 167).

Comparative Effects of Deficiency of A- and B-Vitamins.

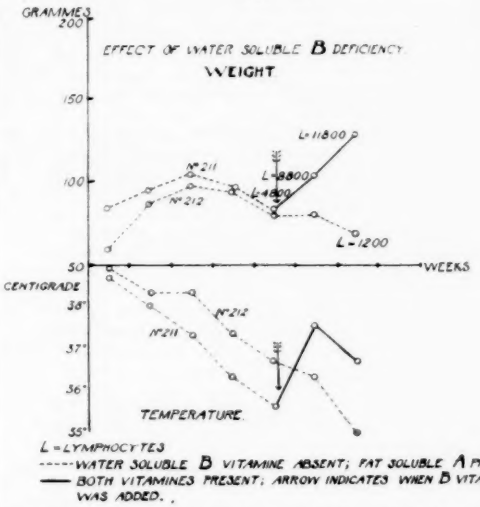
When a diet deficient in B-vitamin but containing vitamin A is given, the same general results follow in rats as when both vitamins are absent (see Fig. 3, rats 211 and 212). There is the same initial cessation of growth, followed by a decline in weight and a gradual fall of the temperature. In the final stages of the water-soluble B deficiency the animal presents the same condition of emaciation. This identity of the condition for the specific water-soluble B deficiency with that for the complete vitamin deficiency is

FIG. 1.



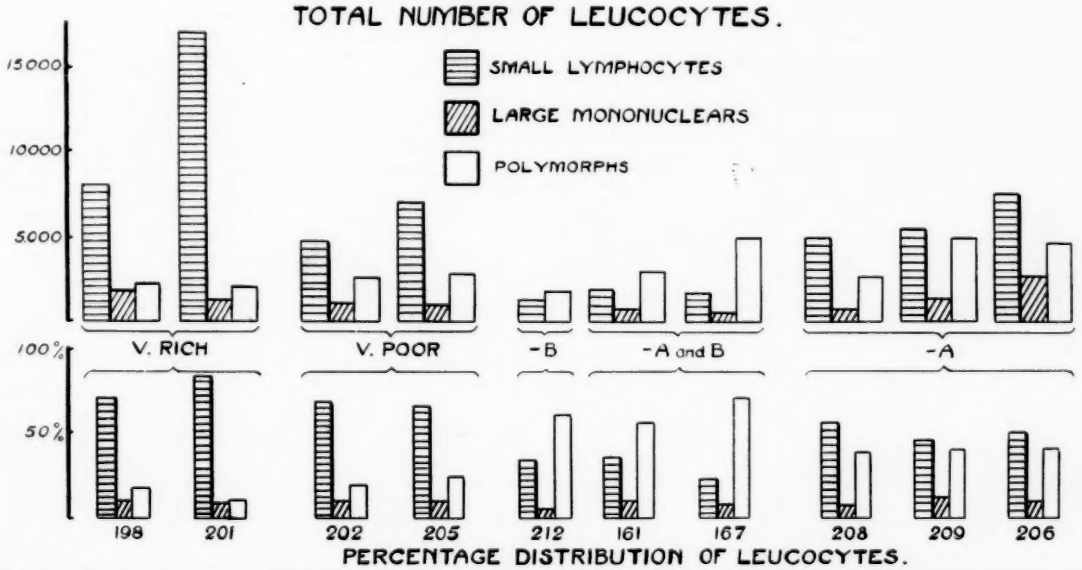
Shows weights of spleen and thymus altering with changes in the diet. Note that the vitamin-rich diet is an artificial diet, while the vitamin-poor diet is a natural diet—namely, the laboratory diet of bread and water, maize and rice referred to in the text, which is, however, adequate to maintain the animals in good health. The weights are given both calculated per 100 g. of body weight (shaded), and in absolute figures for rats of equal age (not shaded). Atrophy as the result of withholding vitamin B, no atrophy when vitamin A is withheld. Great increase in weight when an abundant supply of vitamins is given.

FIG. 3.



Curves of weights and of temperatures and number of lymphocyte counts of two rats on a diet free from vitamin B alone, but containing an abundant supply of vitamin A. Effect on weight, temperature, and number of lymphocytes of adding the deficient vitamin to the diet of one rat (No. 211).

FIG. 2.

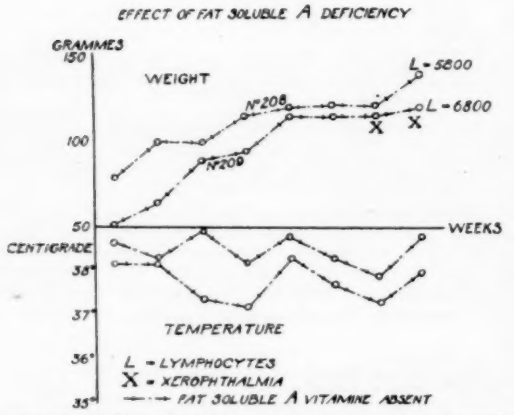


Refers to the same animals as Fig. 1, and shows absolute number of different types of leucocytes and their relative distribution. Lymphopenia when B is withheld and A is supplied in abundance, no lymphopenia when A is withheld and B is supplied in abundance, increase above the normal when an abundant supply of both vitamins is given. The small lymphocytes are most affected; the polymorphs are not affected at all.

generally recognised. It is usually attributed to the fact that the deficiency of the fat-soluble A-vitamin takes a longer time to produce its effect. The blood picture in an animal kept on a diet free from the water-soluble B-vitamin, but containing an ample supply of the fat-soluble A-vitamin is, like the general condition of the animal, identical with that just described for the complete absence of vitamins; a great reduction in the number of lymphocytes, especially the small lymphocytes, is found. The polymorphs show no change (Fig. 2, rat 212; Fig. 5, rat 211).

Quite a different condition is presented by an animal kept on a diet free from the fat-soluble A-vitamin, but containing an ample supply of the water-soluble B. In a typical experiment these animals do not show a gradual fall of the temperature, and even in the last stage do not show the profound emaciation of the water-soluble B deficiency (Fig. 4, rats 208 and 209). There is still a fair amount of fat in the body. A characteristic feature is their great susceptibility to infection, of which xerophthalmia is such a frequent instance that it has been regarded by some observers as a specific result of the absence of the fat-soluble vitamin. Other infections, however, may occur while xerophthalmia is absent. These animals do not show an atrophy of the lymphoid tissue (Fig. 1, rats 208 and 209), nor is the total number of lymphocytes in the blood less than that found in normal animals

FIG. 4.



Curves of weights and of temperatures and number of lymphocytes of two rats kept on a diet free from vitamin A alone, but containing an abundant supply of vitamin B. One of the rats developed xerophthalmia. (Compare with Fig. 3.)

(Fig. 2, rat 208, 209, and 206). Observations on changes on the other elements of the blood are in progress.

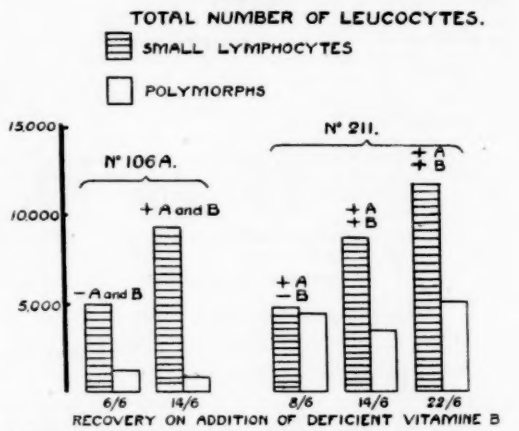
For the purpose of this paper we only refer to the typical condition produced by withholding the A-vitamin alone in order to emphasise that it differs entirely from that produced by the absence of the B-vitamin, both as regards the functional activity of the lymphoid tissue and the general nutritive condition of the animal. The two conditions are contrasted in Table I.:—

TABLE I.

	Lymphoid tissue.	Number of lymphocytes	Temperature.	State of nutrition.
Absence of—				
Vitamin A ..	Not atrophied	Normal.	Normal.	No emaciation.
Vitamin B ..	Atrophic.	Diminished.	Subnormal.	Emaciation.
Vitamins A & B	,,	,,	,,	,,

No less striking than the atrophy of the lymphoid tissue, when the water-soluble B-vitamin is withheld, is the recovery of this tissue when this vitamin is added again to the food. Thus in rat 211 (see Fig. 3), which had been kept on the basal vitamin-free ration and cod-liver oil for five weeks, the total number of lymphocytes had fallen to 4800 at a time when the temperature had become very subnormal (35·6°). The weight was then 80 g. The water-soluble B-vitamin was then added in the form of yeast. Within six days the total number of lymphocytes increased to 8800; after another week it had risen further (see Fig. 5) to

FIG. 5.



Total number of leucocytes in vitamin deficiency and recovery after the deficient vitamin has been supplied. Rat 106A had been kept on a diet free from both vitamins A and B for seven weeks until 6/6, when both vitamins were added to the diet. Rat 211 (see Fig. 3) had been kept on a diet containing an ample supply of the fat-soluble A, but deficient in water-soluble B for five weeks until 8/6, when the deficient vitamin was added.

11,800. This rise was accompanied by a complete change in the general appearance of the animal, which rapidly increased in weight to 130 g. in two weeks and had a normal temperature. (Fig. 3.)

In rat 106A (see Fig. 5), which had been kept on a completely vitamin-free basal ration for seven weeks, the total lymphocytes were found to be 5000. Then both vitamins were added and 12 days later the count gave 9900 lymphocytes. There is also a rapid increase in the size of the spleen and thymus, and the Peyer's patches stand out again very prominently. When one considers the extreme degree of atrophy of the thymus in the absence of the B-vitamin, it is astonishing to see the large mass of tissue in an animal which has received the water-soluble vitamin for only a few days (7–10 days). Histologically the various lymphoid tissues show a very active formation of small lymphocytes. Accompanying this change in the lymphoid tissue is the well-known effect on the general nutrition of the animal. It rapidly puts on weight and gets fat, its ordinary adipose tissue getting well loaded with fat.

A Specific Function of the Lymphocyte.

These observations indicate that a specific relationship exists between the water-soluble B-vitamin and lymphoid tissue in the sense that the formation of lymphocytes is impaired in the absence of this vitamin. As a result of our observation the following conception of the mode of action of B-vitamin deficiency has been arrived at: *the lymphocyte has an important and specific function in maintaining the nutrition of the cells of the body, and the disturbances in nutrition which follow the withholding of B-vitamin are secondary to a specific lesion which leads to an interference with the functional activity of the lymphoid tissues.*

This conception will now be considered under the following headings: (*A*) Observations show that an ample supply of vitamins, as compared with a supply restricted but adequate to enable the animals to grow, to breed, and to maintain them in all respects in normal health, has a favourable effect on the functional activity of the lymphoid tissues and on nutrition.

(*B*) A consideration of the effects of X radiation upon animals shows that a primary destruction of lymphocytes is followed by disturbances in nutrition identical with those produced by withholding B-vitamin. (*C*) Other evidence on the relationship between the functional activity of the lymphoid tissues and the nutrition of the body. (*D*) A criticism of the prevalent conception that vitamins are essential for the life of every cell.

A. *Effect of a Diet Rich in Vitamins.*—The effect of a diet particularly rich in vitamins has been compared with that of a diet poor in vitamins but containing sufficient to maintain the animals in good health and in a normal condition.

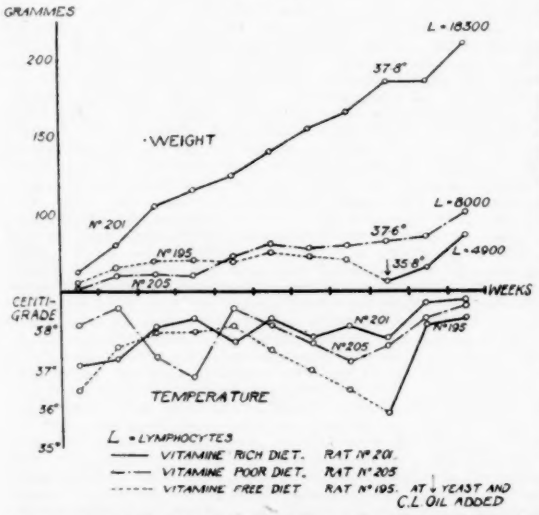
TABLE II.

Diet.	Rat No.	Weight in g.		Final length in cm.*	Weight in mg. of—		Lymphocytes distribution.				
		Initial.	Final.		Spleen.	Thymus.	Total in 1 c.mm.	Small L.	Large L.	Polym.	Eosinoph.
Vitamin-rich	198	40	110	15·5	740	330	9,600	71·5%	8·5%	17·5%	2·5%
	201	60	210	18·5	1060	690	18,300	83·0%	6·0%	11·0%	0·0%
Vitamin-poor	202	40	80	14·25	460	185	5,800	67·5%	11·0%	15·0%	6·5%
	205	50	100	14·5	360	105	8,000	64·5%	8·5%	25·5%	1·5%

* Nose to root of tail.

The vitamin-rich diet is an artificial food mixture and consisted of the vitamin-free standard basal ration (extracted casein, starch, olive oil, salt mixture) to which dried yeast and cod-liver oil had been added. The vitamin-poor diet is a natural diet. It consisted of a diet of bread soaked in water alternating with boiled rice and maize. This has been for years the usual diet of all the rats of the Imperial Cancer Research Fund laboratory. That this diet maintains them in good health is evident from the fact that they breed on the diet and suffer little from intercurrent disease, epidemics being rare. They put on weight and grow, though slowly. Table II. gives a comparison of two young rats kept on this

FIG. 6.



Curves of weight and of temperature and number of lymphocytes of three rats kept on an artificial diet rich in vitamins, on a natural diet poor in vitamins, and on a completely vitamin-free diet respectively. Also recovery of rat 195 kept on the vitamin-free diet when vitamins are added again.

laboratory diet for ten weeks with two rats of equal age kept on the vitamin-rich diet. The latter put on weight and grow in size much more rapidly although the diet is artificial. There is no difference in the temperature, but there is a distinct difference in the development of the lymphoid tissue. The weight of the thymus of rats of equal age is much greater on the vitamin-rich diet; it is heavier even when calculated for 100 g. of body-weight. (See Fig. 1.) The spleen also tends to be heavier on the vitamin-rich diet if calculated per 100 g. of body-weight, and is much heavier when the absolute figures, comparing animals of equal age, are considered. (See Fig. 1.) The total number of lymphocytes is also higher on the vitamin-rich diet. (Fig. 2.) In rat 201 (see Fig. 6), which grew most rapidly and reached the weight of 210 g. in ten weeks, while in the same time another rat (No. 205) with the same initial weight, but kept on the laboratory diet, had reached only 110 g., the total number of lymphocytes gave the exceptionally high figure of 18,300. That this was not accidental or due to an error was confirmed by another count a few days later, which gave 17,800. It has been noted that rats from the laboratory of the Radium Institute, where a very varied diet is given, grow much more quickly and give lymphocyte counts decidedly higher. These experiments emphasise the importance of the vitamins. Not only is a certain minimum necessary for the healthy vegetative and reproductive life of an animal, but if increased beyond this limit the vitamins, in a drug-like action, produce a further effect.

We therefore feel justified in concluding that an ample supply of vitamins A and B stimulates the functional activity of lymphoid tissue and that this is associated with more rapid growth and a general improvement of nutrition.

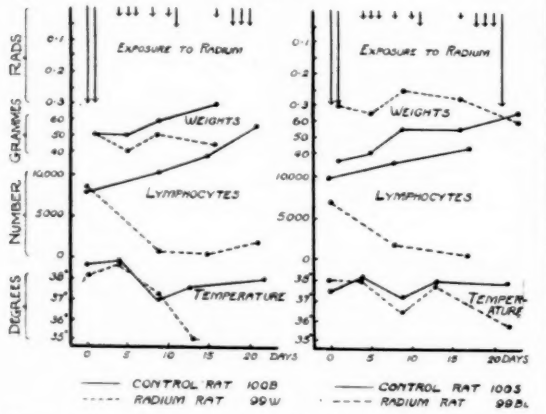
B. *Effects of Exposure to X Rays or Radium.*—A consideration of the effects of exposure to X radiation or to radium has an important bearing on the thesis.

The first change to be observed is a diminution in the number of circulating lymphocytes; so sensitive is this reaction that an amount of radiation insufficient to be detected photographically will cause an appreciable diminution in the number of circulating lymphocytes within an hour after exposure. Not only do the circulating lymphocytes disappear from the blood, but moderate exposures will sterilise the whole body of lymphoid cells so that an examination of spleen, thymus, or other lymphoid tissues will reveal a more or less complete absence of these cells. If by means of repeated small doses of radiation this lymphopænia be kept up, changes subsequently occur in the animal identical with those resulting from the withholding of B-vitamin. The animal rapidly loses weight, the temperature falls, the testicles present an atrophic condition, adipose tissue disappears, and the animal finally becomes "marasmic" and dies.

The immediate disappearance (within an hour) of circulating lymphocytes following radiation has no decided analogy with the effects of withholding vitamin B; on the other hand, the general and maintained absence of those cells associated with repeated doses of radiation appears to be due to an interference with their production, and a similar want of production is to be observed in the lymphoid tissues of animals starved of vitamin B. In this respect, also, the two effects would seem to have common ground. The regeneration of the lymphoid tissues, which follows the atrophy due to radiation when exposure is discontinued, is strikingly similar to that observed in vitamin experiments when the deficient vitamin B is added to the diet. The spleen, thymus, and other lymphoid tissues increase in size and present abundant production of lymphocytes; the blood content passes from exhibiting a lymphopænia to a lymphocytosis, which may sometimes far exceed the normal limit; and the general condition of the animal then becomes normal. Fig. 7 gives the results of an experiment especially designed to illustrate these effects of radiation, which since their discovery 15 years ago,[9 10] have been extensively studied, both in this country and in the United States.[18 19 23 27 28] The observations were made on eight rats, of which four were subjected intermittently to exposures of radium over a period of 21 days, while the other four animals were kept as controls. The amount of radiation applied was measured. By the use of screens, and by varying the amount of radium bromide, the exposure to radium was varied on different days. The maximal exposure given at one time was 0·29 rads and was given on the first two days and on the last day. The intermediate exposures were smaller and varied from 0·02 rads to 0·04 rads. The total exposure given over the whole period amounted to 1·25 rads,

the difference in the length of the arrows giving an approximate indication of the amount of exposure in rads applied on different days. All the four rats exposed to radium reacted in the same way: cessation of growth, fall of temperature, and lymphopænia. When killed the animals showed macroscopically atrophy of the lymphoid tissues; the Peyer's patches were difficult to identify, the thymus had disappeared almost completely, the spleens were very small; in three of the animals the splenic weight was determined and found to be 40 mg., 90 mg., and 110 mg. respectively. Microscopically these tissues were depleted of lymphocytes, and cell division of the plasmoidocytes is infrequent. The figure illustrates the effects of radiation on growth, temperature, and number of lymphocytes with reference to two of the rats, and demonstrates clearly the great similarity to the condition presented by animals in which the lymphoid tissue is undergoing atrophy as the result of withholding the water-soluble vitamin B.

FIG. 7.



Effect of exposure to radium on the body-weight, temperature, and number of lymphocytes. The amount of exposure to radium measured in rads is indicated approximately by the length of the arrows.

C. *Function of Lymphoid Tissue with Relation to Nutrition.*—What is the nature of the function of the lymphoid tissue in relation to nutrition? Unfortunately our knowledge of the function of the lymphoid tissue has hitherto been very obscure in spite of the large amount of work that has been devoted to it. We know very little concerning the condition determining the formation of lymphocytes. The problem of the fate of the lymphocytes is also not yet solved.

From observations on the number of lymphocytes entering the blood stream by the thoracic duct Davis and Carlson [6] conclude that many more lymphocytes enter the blood with the lymph in the course of 24 hours than can be found in the blood at any given time. Bunting and Houston[1] have confirmed this conclusion. They calculate that 3,300,000,000 cells enter the blood stream during 24 hours. Since the number of lymphocytes in the circulating blood remains approximately normal, lymphocytes must either constantly be undergoing disintegration within the body or leave the blood stream. It is probable that both these processes take place. Lymphocytes may temporarily leave the blood stream and return to it by the thoracic duct. Another fraction may leave the body altogether, as Bunting and Houston suggest, by passing through the intestinal mucous membrane into the lumen of the intestine. It is certain from histological evidence that a disintegration of lymphocytes takes place in the lymphoid tissue. But what determines the disintegration of lymphocytes, and what relation there is between disintegration and new formation of lymphocytes, are questions to which no certain answer can as yet be given.

There is evidence that the lymphocytes take a part in the absorption of food from the intestinal canal, where they are present in large numbers in the villi. Fatty substances on account of their specific staining reactions can be shown to be absorbed by lymphocytes.[24] Such histological evidence cannot at present be brought for the nitrogenous constituents of the intestinal contents. But chemical evidence to that effect was furnished by one of us, who showed that during digestion the corpuscular elements of the blood are richer in non-coagulable nitrogen than during fasting.[4] This and observations on the absorption of protein introduced parenterally led to the conclusion that the leucocytes take a part in the absorption of the nitrogenous food materials.[3] There are, therefore, two channels by which food material is absorbed and utilised; it is carried partly in solution in the fluids of the blood and partly it is ingested and carried by the cellular elements, presumably the lymphocytes. The passage along the path represented by the lymphocytes is impeded when a lymphopænia has been established either by withholding the water-soluble B-vitamin or by exposure to radiation, and disturbances in nutrition leading to marasmus ensue. There is evidence that the absorption of food is impaired in yet a different manner, when the water-soluble B-vitamin is withheld. Rats kept on the vitamin-free basal ration show, when killed four hours after the food has been given, a stomach distended with food. The intestine is more flaccid and more dilated than in an animal which has received the same ration with the addition of the water-soluble vitamin, and the peristaltic movements are less powerful. The blood-vessels in the pyloric portion of the stomach and in the intestine are not so dilated. This effect on the intestinal tract is an immediate one and occurs at once when the water-soluble vitamin is withheld. The explanation of this apparent general paresis of the intestinal tract requires further investigations. It accounts, perhaps, for the reduced intake of food which, as several observers have noticed, occurs when the water-soluble vitamin is withheld and which so far has received no satisfactory explanation. As shown by the well-filled stomach, the animal does not decline to take food when the water-soluble vitamin is withheld, but the intestinal tract appears to be unable to deal with the food as efficiently as when the vitamin has been given; therefore the capacity to take food is limited. Our attention has been drawn recently to a paper by Lumière,[16] who describes a similar effect in pigeons as the result of feeding on polished rice.

It might be held that the reduced intake of food is in itself an adequate explanation of the condition of marasmus, which is the result of the deficiency of the water-soluble vitamin. This possibility has been considered by Hopkins and later by Drummond,[2] and they are agreed that the reduced food intake is not in itself an adequate explanation of the decline in health which the animals undergo. This view has received confirmation recently by the observations of Karr[14] on dogs. These animals also showed a reduced food intake when the water-soluble vitamin was withheld. But one dog exceptionally maintained its normal food intake. Nevertheless, it, too, passed into the same abnormal condition as the other dogs with a reduced food intake.

Jolly[12] and his collaborators[13] have made an extensive study of the effect of acute and chronic starvation on the lymphoid tissue. They found an atrophy of this tissue, especially of the spleen and thymus, accompanied by a great rarefaction of lymphocytes; in fact, a condition similar to that occurring after radiation and after withholding vitamin B. They also state that chronic underfeeding produces a more intense atrophy than acute starvation. They do not appear to have examined the circulating blood for a lymphopænia. As a result of his observations Jolly[12] looks upon the lymphoid tissue "comme un tissu renfermant des réserves précieuses, d'une grande noblesse au point de vue de la constitution chimique auxquelles l'animal peut faire appel à certains moments. . . . . Le tissu lymphoïde nous apparait ainsi à la fois, comme une réserve de cellules sanguines et comme une réserve de constituants nucléaires." Further observations are necessary to determine whether starvation alone produces as marked a lymphopænia as the withholding of the B-vitamin. In man observations have been made only with reference to the total number of leucocytes, and the effects are apparently not constant. Von Noorden[21] states that in his clinics low numbers—3000 to 4000 total leucocytes—were frequently found in persons emaciated from underfeeding. But he also quoted other observers who have obtained nearly normal figures in such cases. Different results were also obtained on one and the same man, the fasting man Succi; Luciani[15] records a fall from 14,530 to 861 per c.mm. between the first and seventh day. Then they rose to 1530 per c.mm. and remained there throughout his 30 days' fast. In Vienna, however, Tauszk[27] recorded on the same person on another occasion a more gradual diminution from 9600 on the third day to 4200 on the thirtieth and last day of the fast.

Human pathology furnishes further evidence in support of the intimate relation of the lymphoid tissue to nutrition. The blood of infants and young children is particularly rich in lymphocytes, and during the first year gives figures as high as 8000–10,000 per c.mm.[7 11] The lymphocytes then gradually diminish in number, but the level of 2000 per c.mm. which persists throughout adult life is not reached until the sixth year. The fact that disturbances of the adenoid tissue are of special significance in childhood and are frequently associated with disturbances in nutrition[11] is well known. There are, moreover, in infants conditions of marasmus which cannot be ascribed to neglect or deficient

feeding, and in which the only lesion found so far has been atrophy of the thymus.[25] We have not been able to find in the literature systematic observations on the condition of the lymphoid tissue generally in this condition. Dr. D. H. Paterson[22] has kindly informed us that in his observations on post-mortem examinations of cases of malnutrition and marasmus carried out in the Hospital for Sick Children, Great Ormond-street, he has always found an atrophy of the spleen associated with an atrophied thymus, and that the Peyer's patches were so atrophic that they could not readily be made out. We have not been able to find in the literature observations on the lymphocytes in the different conditions of malnutrition and marasmus.

D. *Necessity of Vitamins for Individual Cell Life.*—Are vitamins necessary for the life of the individual cell or for the life of the animal as a whole? The fundamental assumption has been made—and is now generally accepted—that every living animal cell requires not only foodstuffs but also vitamins: life cannot exist without vitamins. That is, in fact, the definition of vitamins.

MacCarrison[17] suggests as an explanation the analogy that "vitamins are as the spark which ignites the fuel mixture of a petrol-driven engine, liberating its energy. The spark is of no use without the fuel, nor the fuel without the spark." Although the animal continues to take in food, its cells cannot utilise the food and starvation results. We may remark in passing that this generalisation does not apply either to the C-vitamin—since rats do not suffer in health if this vitamin is withheld—nor to the A-vitamin, since starvation does not, as a rule, result when this vitamin is withheld. The generalisation was, in fact, established on the basis of the earlier experiments on pigeons and rats before the existence of several vitamins had been recognised and when either the B-vitamin was withheld alone or when a complete absence of vitamins had been established. This in itself weakens the conception of vitamins as substances essential to the life of all cells. But we shall argue here as if this conception applied to the B-vitamin alone. In our preliminary note[5] we have already criticised this conception. But it is of such fundamental importance that it may not be out of place to repeat and extend our criticisms.

The evidence on which the conclusion is based is derived entirely from experiments on highly differentiated animals—viz., mammals and birds. If the conclusion is correct it should apply to all forms of life. Numerous attempts have in fact been made to show that it applies to even the lowest forms of life: yeasts, bacteria, and plants. The case of yeast is of special interest because it is particularly rich in the water-soluble B-vitamin. It must therefore either be capable of synthetising this vitamin or it must be dependent on a pre-formed supply. The recent work of Nelson, Fulmer, and Cessna[26] has shown quite clearly that yeast is capable of synthetising the water-soluble B-vitamin, and Harden and Zilva[8] have independently arrived at the same conclusion. Since this paper was written Coward and Drummond[2] have published observations which prove that plants can synthetise the fat-soluble A-vitamin, and that apparently this synthesis may be effected from inorganic salts. The experimental evidence on which the claim of the indispensability of vitamins for the lower forms of life was based has been subjected to a critical review and experimental test by Lumière,[16] who showed that these experiments quite clearly established the facts that the lower forms of life can live and grow in the absence of vitamins. The addition of material containing vitamins had merely a stimulating effect on the growth of these cells, and it was not even clear whether this effect was due to the addition of the vitamins or to other organic material.

The generalisation that life cannot be maintained in the absence of vitamins, even in its limited form as applying to the B-vitamin, does not necessarily follow from the experimentally established facts. These facts are that a highly differentiated animal—a bird or a mammal—dies in a condition of starvation when the B-vitamin is absent. But although a highly differentiated animal as a whole requires vitamins in order to maintain its life, it does not follow that all the cells of such a highly differentiated animal require the vitamin. If such animals presented a definite lesion in some organ or tissue essential to life, and if such a lesion would account for the condition of emaciation and the eventual death of the animal, then the generalisation that all cells require vitamins, or even this particular vitamin, would have to be abandoned. In the past such a lesion has not been found. The functional atrophy of the lymphoid tissue throughout the body had not been noticed and the importance of the function of this tissue in relation to nutrition was not recognised. Starvation was looked upon as the primary effect caused by the absence of B-vitamin, and the atrophy of spleen and thymus which has been repeatedly noticed by several authors was regarded as the result of the chronic starvation.

That the absence of the B-vitamin ultimately leads to a condition of emaciation similar to that produced by the complete absence of food is beyond doubt. To the view that this is due to the failure of the cells of the body to utilise the food absorbed from the intestine in the absence of the B-vitamin we oppose the conclusion that it is due to a specific lesion which leads to a functional atrophy of the lymphoid tissue. Such an atrophy of the lymphoid tissue, whether it is brought about by withholding the B-vitamin or by exposure to radiation, or by any other agency such as a toxin, produces a condition of marasmus.

Therapeutic Considerations.

This conclusion suggests the possibility of therapeutic applications apart from the obvious one in conditions of marasmus associated with a lymphopænia. We have seen that an abundant supply of the water-soluble B-vitamin stimulates the functional activity of the lymphoid tissue and increases the number of lymphocytes in the circulating blood. The administration of this vitamin may therefore have a favourable influence in the course of infections in which the defence depends on the activity of the lymphocytes. The old-fashioned administration of yeast to persons suffering from boils is perhaps an empirical application. Conversely it may be possible to inhibit the excessive production of lymphocytes in lymphatic leukæmias by withholding this vitamin. Another more obvious application which would appear to follow is that persons undergoing treatment by X rays or radium, or working with these radiations should receive an ample supply of this vitamin in their diet. We are at present investigating whether the resistance of animals to radium can be increased by an abundant supply of vitamins.

Summary and Conclusions.

Absence of the water-soluble B-vitamin from the diet leads in rats and mice to an atrophy of the lymphoid tissue throughout the body and to a lymphopænia in the circulating blood. The polymorphonuclear leucocytes are not affected. Absence of the fat-soluble A-vitamin does not lead to an atrophy of the lymphoid tissue and there is no lymphopænia.

Absence of the water-soluble B-vitamin leads to characteristic nutritional disturbances such as loss of weight, emaciation, subnormal temperature which may be designated by the term "marasmus." No such marasmus results from withholding the fat-soluble A-vitamin.

The lymphopænia established by withholding the water-soluble B-vitamin is rapidly abolished by the administration of the water-soluble B-vitamin and, pari passu with it, the concomitant marasmus. A permanent lymphopænia, and associated with it an atrophy of the lymphoid tissue throughout the body, can also be induced by exposure of rats to sufficient doses of X rays or radium. Such animals then also develop a condition of marasmus similar to that observed when the water-soluble B-vitamin is withheld. Since the functional disturbances in the lymphoid tissue produced by two such widely different agencies lead to the same nutritional disturbances it is concluded that the lymphocytes play a part of fundamental importance in the nutrition of the body. Other evidence points to the conclusion that they are concerned in the absorption and assimilation of food from the intestine.

Further evidence of the existence of an intimate relationship between the functional activity of the lymphoid tissue and the general nutrition of the organism is afforded by the fact that an abundant supply of the water-soluble B-vitamin has a favourable effect on the development of lymphoid tissue and the number of lymphocytes, and associated with it on the general nutrition of the animal. There is, further, the clinical experience that disturbances of lymphoid tissue are of special significance in infancy and are there frequently associated with nutritional disturbances.

The conception that vitamins—and the B-vitamin in particular—are necessary for the life of every individual cell is criticised. This vitamin is necessary for the maintenance of life of a highly differentiated

animal, not because its presence is necessary for the life of all the cells of such an animal, but because its presence is necessary for the normal functioning of lymphoid tissue. In other words, the term "deficiency diseases" is, like the term "vitamin," a misnomer. These diseases have their origin, like other diseases, in specific lesions. These lesions may be induced by different agencies of which a deficiency in vitamins is only one.

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THE EFFECT OF B-VITAMIN ON THE APPETITE.

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YOUNG rats fed on diets deficient in vitamin B lose weight after varying periods of time and finally die in a condition of emaciation. It was thought interesting to determine whether diminished food intake was a contributory factor in this loss of weight. Young rats from the same litter were employed. All the animals were fed for the first two weeks on a basal ration containing vitamin A and B in the form of cod-liver oil and marmite respectively. The basal ration was the one usually employed by workers in this field and contained purified caseinogen, starch, and a salt mixture. As a source of fat containing no vitamin A a specially prepared form of palm-kernel oil was used. It consisted of an edible quality of palm-kernel oil which had been heated for four hours at 160° C., and subsequently treated with superheated steam at 230° C. Experiments (unpublished) have been carried out with this substance, which show that palm-kernel oil, after such treatment, is quite free from the fat-soluble A vitamin.

Method of Experiment.

The rats were kept in metabolism cages in a warm room. The food—placed in beakers which were firmly fixed in the cage so that no spilling could occur—was presented twice a day, in the morning and evening, and on each occasion was allowed to remain in for a period of one hour. The average daily intake of each animal on such a diet was thus determined. After two weeks both vitamins were removed from the diet of certain of the rats. The others were kept on the diet rich in vitamins, and served as normal controls. At once, within 24 hours, the animals receiving the vitamin-free diet showed a considerable fall in their food intake. The level of intake remains low throughout the period that this diet was maintained. At the same time there was also a steady decline in the weights of the animals. Thus, one of the rats which had been consuming on an average 9·37 g. daily now only took 5·64 g.: during this period, too, its weight fell from 55 g. to 43 g. The control animal fed on a diet rich in vitamins maintained a daily intake of 14·20 g. and its weight rose from 72 g. to 110 g. (Table I.)

TABLE I.

Week of experiment.	R 1. Diet.	R 1. Average daily intake.	R 1. Weight 36 g.	R 2. Diet.	R 2. Average daily intake.	R 2. Weight 39 g.
		g.	g.		g.	g.
1	Normal	8·95	48	Normal	12·6	57
2	Normal	9·79	55	Normal	13·1	72
3	Vitamin-free	4·8	53	Normal	11·98	83
4	Vitamin-free	6·41	46	Normal	13·7	99
5	Vitamin-free	5·73	43	Normal	15·94	110

A trace of marmite was now added to the diet of the vitamin-free animals. It was administered separately in the mornings about two hours before the first feed. The marmite was eagerly consumed by the animals. The intake of the basal ration at once rose and at the same time the weights began to improve. The improvement in intake was as rapid in onset as the fall had been after the removal of the vitamins. In the case of the above-mentioned animal the intake rose from 5·73 g. to 8·66 g. daily. The weight rose from 43 g. to 59 g. in a period of three weeks. It should be noted that the intake never reached the level attained during the period when both vitamins were administered. (Table II.)

TABLE II.

Week of experiment.	R 1. Diet.	R 1. Intake.	R 1. Weight.	R 2. Diet.	R 2. Intake.	R 2. Weight.
		g.	g.		g.	g.
6	Vitamin-free and trace of marmite	10·22	51	Normal	14·6	115
7	Vitamin-free and trace of marmite	7·66	55	Normal	13·8	120
8	Vitamin-free and trace of marmite	8·22	59	Normal	14·2	123

Previous Experiments Summarised.

The literature on the subject is not very extensive. Drummond[1] has investigated the protein metabolism in rats fed on diets containing no vitamin B. He was unable to detect any abnormality sufficient to account for the inability to maintain weight. During the course of these experiments he noted that the food-consumption of the rats fed on the diet deficient in vitamin B was reduced. Increased consumption could be brought about by the addition of flavouring agents to the diet. The same effect was produced by the addition of water-soluble vitamin B. Only when the vitamin was added, however, was there any resumption of growth. Drummond[2] has also shown that there is no disturbance of fat absorption in the absence of the fat-soluble vitamin A from the diet.

Karr[3] carried out experiments on dogs, in which weighed quantity of food deficient in water-soluble vitamin B was presented to the animals. At first the portion was completely consumed. Subsequently most of the animals refused to take a part, and ultimately failed to eat any. The desire to eat could be restored on addition of vitamin B. The same result was obtained if the vitamin was presented apart from the food. In the case of one animal, although the intake remained normal, the usual symptoms produced by the vitamin deficiency made their appearance.

Cowgill [4] utilised these results as a test for the presence of vitamin B in natural food-stuffs. He found that the potency in promoting appetite ran parallel to the potency in relieving symptoms in polyneuritic animals.

Lumière [5 6] fed pigeons with decorticated rice and noticed a marked diminution of intake. There was evidence of stasis in the upper part of the digestive tract. The rice was seen to lie as a compact mass in the stomach. Trituration was defective, and the onward passage of the bolus through the pylorus was greatly delayed. There appeared to be a condition of deficient glandular secretion and hypotonus of the intestinal wall. A small dose of extract of rice polishings provoked abundant glandular secretion and stronger intestinal movements which resulted in rapid evacuation of the masses of polished rice lying in the upper intestine. He found that these animals die sooner than starving animals, and quotes Forster, who obtained similar results in dogs.

There appears, therefore, to be a considerable accumulation of evidence that the appetite is adversely affected by the absence of vitamin B from the diet of animals. It is insufficient, however, to state that the vitamin acts by diminishing appetite. Appetite is a general conception, the physical expression of

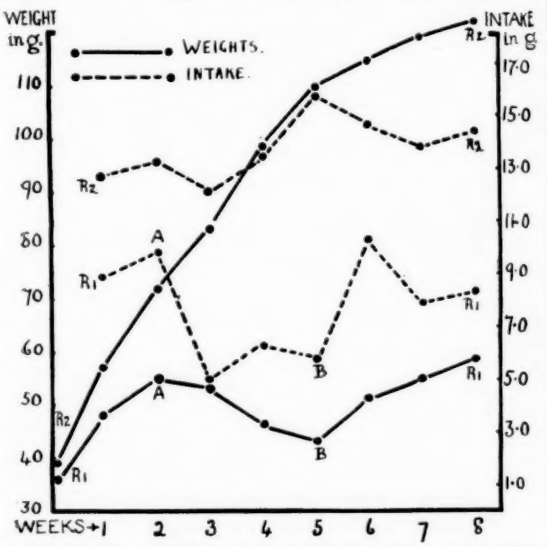

Chart showing weight and intake curves of two rats. R 2: both vitamins administered throughout. R 1: both vitamins administered at first. At A both vitamins were removed; at B a trace of marmite was added to diet. Note sudden falling off of food intake at A and rapid recovery at B.

which is the food intake. The problem still remains to explain why the intake is lowered when the vitamin is withheld. It is a general experience that on post-mortem examination of rats fed on diets deficient in vitamins A and B to find the stomach full of food and active fermentation in progress. Sometimes the stomach is definitely dilated. This finding suggests that there is some defect in the power of the stomach to deal with its contents and propel them farther down the intestinal canal. Lumière, too, found the food lying as an inert mass in the stomach of the pigeons experimented on. From a study of the work detailed, it is suggested that the diminished intake may be accounted for quite simply in the following way. The contractions of the stomach wall are weak, the secretion of the gastric glands is defective, and as a result the stomach is never empty. It is always partly distended with fermenting material. Hunger contractions do not take place, the craving for food becomes low, and the intake falls off considerably. This theory, that the defect lies in the stomach, receives valuable support from the fact that the animal responds so very rapidly to the re-addition of the vitamin to the diet. In rats the rise in intake is marked at the end of 24 hours. In pigeons, rapid evacuation of the contents of the intestinal canal occurred immediately after administration of the vitamin. Admitting the fact of lowered food intake, it must be borne in mind, however, that the loss of weight shown by the animals, and their ultimate death, can still only be partially accounted for. In Drummond's experiments,[1] improved intake was obtained by adding flavouring agents to the diet; growth, however, only occurred when the vitamin was added. In one of Karr's dogs, though the intake remained high in the absence of the vitamin, general symptoms of the vitamin deficiency developed. Forster's experience, that dogs succumbed more rapidly on a vitamin-free diet than when completely deprived of all food, is also very significant.

It may be concluded with some degree of assurance that vitamin B produces its effects by acting primarily, if not solely, on the intestinal canal. In its absence muscle-tone is diminished, peristaltic movements are weak, and there is a reduction in the amount of digestive juice secreted. As a result, stasis occurs, the appetite flags, and the food intake falls off considerably. It is almost certain, however, that the animal is still consuming sufficient to enable it to survive for considerably longer periods than it actually does. The explanation for the early decline may perhaps be found in the changes which occur to the food which is retained for an abnormally long time in the intestine. Fermentation soon sets in and toxic bodies may be produced which adversely affect the general health of the animal, death resulting from the combined effects of all the factors mentioned.

Conclusion.

Vitamin B acts by facilitating the efficient carrying out of the functions of the intestinal canal. The main effects produced by the absence of the vitamin—i.e., diminished food consumption, loss of weight, and ultimate death—are due to intestinal stasis and the absorption of toxic bodies which results therefrom.

The expenses of this research have been partly defrayed by a Government grant made through the Royal Society. The prepared palm-kernel oil was kindly presented to me by Messrs. Lever Bros., to whom I tender my thanks.

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AORTIC INCOMPETENCE:

A CLINICAL STUDY.

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THE following analysis of cases of aortic valvular disease was undertaken largely with a view to discovering, if possible, those untoward signs in routine clinical examination which might possibly be utilised to give some warning of the sudden terminal event which so frequently disconcerts the patient's relatives and the physician in charge of the case.

Material and Incidence.

Fifty cases have been taken in the unselected order of their coming under hospital care, and form one section of a series of about 400 heart cases which have been examined. Thus aortic disease would constitute 12½ per cent. of the cardiac cases, a much lower proportion than that found at the Edinburgh Infirmary (Gillespie, Edin. Hosp. Rep., 1898). The lower percentage is no doubt accounted for by the large number of cases sent to a heart clinic nowadays and classified under the heading "effort syndrome." In no instance in this series was a diagnosis of aortic stenosis made, the only cases showing a thrill at the base of the heart being such as were shown by X ray to have an aneurysm. The average age of the series was 38 years, the youngest patient being 21 and the oldest 67. Only five cases occurred in women and 40 of the cases were married.

Pathogeny.

The pathogeny may be considered under five headings, as follows:—

(1) *Rupture of a valve segment.*—One case may possibly have originated by rupture of a valve segment, but there is no conclusive evidence. The patient fell down a cliff side with a machine-gun on Gallipoli in 1915, was picked up unconscious, found to have a cardiac lesion, invalided home and out of the service, and died in hospital from cardiac failure with general anasarca. The diastolic murmur was always high-pitched and musical in quality. No post-mortem was permitted. No history or evidence of past rheumatism or syphilis was obtainable. The total duration of the disease was five years.

(2) *Acute rheumatism.*—There is considerable difficulty in separating the cases due to rheumatic endocarditis from those not so caused. Two methods were attempted, firstly by careful collection of childhood and adult histories with regard to rheumatic affections, including chorea, tonsillitis, scarlet fever, growing pains, &c. Thus 21 cases gave evidence of rheumatic fever; two other cases gave a history of severe sort-throat or scarlet fever which appeared to stand in direct causal relation to the disease. Two cases had suffered two attacks, and one case three attacks, of rheumatic fever. In only one case of the series was a history of rheumatic affections in the family obtained. Of the female cases all were definitely rheumatic in origin, except one case which at the post-mortem was found not to have aortic incompetence. In only 11 of the 21 cases was the cardiac lesion discovered at the time of the rheumatic attack. The second method attempted for separating the cases of rheumatic origin was from the character of the mitral lesion found. Rheumatic endocarditis is more likely to affect the mitral valve, giving rise to stenosis, than any other ætiological factor at present known. Sixteen cases were found to present a presystolic crescendo murmur at the apex. No attempt was made to differentiate the murmur of true stenosis from the Austin Flint murmur. In my opinion it is not usually possible. Of the 16 cases presenting two murmurs, aortic diastolic and mitral presystolic, there was a definite history of rheumatism in 11 cases, a positive Wassermann reaction (W.R.) in three cases, and evidence of arterio-sclerosis in two cases. It is probable that the presystolic murmur heard in the syphilitic and arterio-sclerotic cases was produced by the method to which Flint drew attention. No post-mortem evidence is yet available.

(3) *Syphilis.*—W.R.'s were tested in 45 cases; 16 of them proved to be positive, 11 being positive 1 in 40 dilution of serum, and 5 positive 1 in 5 dilution. In four cases there was a history of rheumatic fever as well as a positive W.R.; in two of these the cardiac lesion appeared to be the direct and immediate outcome of the rheumatism, but in the other two the heart lesion was found 18 and 26 years after the rheumatic attack, and was probably syphilitic.

(4) *Arterio-sclerosis.*—Twelve cases were found in which neither of the preceding ætiological factors were active. In seven of these the occupation was known to entail unusually heavy work, but in the other five cases the work was light. Two of these cases were found to have deficient renal function.

(5) *Infective endocarditis.*—With regard to an infective active endocarditis without associated rheumatic phenomena, one case had typical acute fulminating ulcerative endocarditis, and four other cases were regarded as subacute bacterial endocarditis.

Duration.

Of the fatal cases the time during which a cardiac lesion was known to have existed averaged only two and two-thirds years. Taking the whole series together the number of years the lesion was known to have existed at the time of examination averaged three and a half years, the period of collection being eight months. Of the 50 cases six were discovered incidentally in the course of general routine medical examination, and were entirely latent, giving no symptoms recognised by the patient. To this number must be added two other cases similarly found, which could not, on account of their nature, be added to this series.

Symptoms.

Pain.—Not severe in character, but recurring at fairly frequent intervals; pain over the præcordium occurred in 26 cases; anginal attacks in two cases; three cases complained of epigastric pain.

Dyspnœa.—Occurred in all cases to some degree, reaching a serious point in six cases; asthmatic attacks repeatedly occurred in two cases, both of which also had anginal attacks. Twenty-one of these patients had some degree of orthopnœa, but in only five was it distressing.

Cough.—Troublesome from time to time in almost all the cases, but forming only in very few the outstanding feature of the disease, even for a short time.

Vertigo.—An almost constant symptom; in several cases the reason for seeking medical advice.

Predisposing Causes.

Various causes have been regarded as contributing either to the actual production of disease or to the final breakdown.

Tobacco.—So far as this series is concerned, tobacco did not appear to affect the issue. Patients who had been heavy smokers, using more than ten cigarettes per day, or three ounces of tobacco per week, were not found; but in all cases where the cardiac condition was giving rise to symptoms the patients volunteered the information that they had given up smoking as they found that it made them worse.

Alcohol.—There was good reason to believe that alcoholic excess had occurred in five cases. On the other hand, 17 cases stated that they were lifelong abstainers.

Games.—In no case was there reason to suppose that playing games stood in any causal relationship to the disease. Neither could it be used to determine the onset of the lesion; several patients who had suffered an attack of rheumatic fever in early life played games successfully and without any difficulty in adolescence.

Work.—Known to have been unusually heavy in 27 cases—not an unusually high proportion in cases limited to the hospital class of patient. Five cases found in which the work was very light, and neither rheumatism nor syphilis had occurred.

Physical Signs.

The physical signs are as follows:—

Tremor.—Striking rarity of those fine tremors of hands and tongue so constantly seen in the effort syndrome cases. In seven cases tremor of hands was well marked, but all seven patients were obviously and seriously ill. In only one case was tremor of the neurasthenic type seen.

Pallor.—Noticed in 30 cases, slight in eight, very striking in six.

Clubbing.—Definite clubbing of fingers in ten cases, in none of which was any sign of a congenital lesion, but in four cases there were other signs of an active infection.

Petechiæ.—Much difficulty was encountered in determining the occurrence of petechiæ. In many cases, originally seen in the out-patient department, and later taken into the wards for observation, such petechial spots as were found around the neck, lateral aspects of thorax and abdomen, outer side of thighs, &c., entirely disappeared after a week in hospital. In only four cases were petechiæ satisfactorily demonstrated; these all had an infective endocarditis and are already dead.

Vessels.—The apparently enlarged, tortuous, pulsating temporal artery was observed in 23 cases; the violently pulsating neck vessels absent in only five cases. Capillary pulsation found 36 times.

Area of cardiac dullness.—This area, as determined by light percussion, was found materially enlarged in all but four cases, in which four there was other evidence that the aortic defect was only slight.

Position of heart apex beat.—Found to be as follows:—Aortic incompetence alone: fifth space, 11 cases; sixth space, 22 cases. Aortic incompetence with presystolic murmur: fifth space, 6 cases; sixth space, 11 cases.

The degree to which the apex beat extended beyond the left nipple line varied considerably, in four cases reaching as far out as the anterior axillary line. The character of the apex beat was normal in nine cases, in seven of which the aortic second sound was audible in the neck. The beat was powerful and heaving in 38 cases, but wavy and extending over several intercostal spaces in three cases—one of which had ulcerative endocarditis, one is thought to have subacute endocarditis, and the third has active syphilis, very thick vessels, and a small heart.

Murmurs.—Only three cases were found in which no murmur was audible at the apex. In 16 cases a presystolic crescendo murmur was audible. The diastolic murmur was itself heard at the apex in 31 cases, and in 10 cases only a systolic murmur was heard there. At the aortic cartilage a to-and-fro murmur was heard in 33 cases; in the remainder of the cases a diastolic murmur only was heard, among the latter the murmur difficult to hear was encountered. In 21 cases the second sound was audible at the root of the neck; in the remainder it was inaudible. As above stated, a presystolic murmur was found 16 times, and of these 16 cases, 11 gave a clinical history of rheumatic affections.

Pulse.—Varied in frequency at rest from 60 to 120 beats per minute; definitely collapsing in character in 35 cases.

Irregularity occasionally noted in four cases; pulse delay in the radial only noticed twice, but was not particularly looked for. Of the cases not recognised as having a collapsing pulse, all but two had also a presystolic murmur; of these two exceptions, one was found post mortem not to have aortic incompetence, and the other had only a small heart giving rise to no symptoms.

Blood pressure.—Brachial blood-pressure readings (with a Tycos instrument and the auscultatory method) were taken in nearly every case. In eight cases the systolic pressure was 120 mm. Hg or less. In all the rest it was above this normal. The difference between systolic and diastolic pressure was usually extremely well marked, in some cases no diastolic reading being possible. The average difference between systolic and diastolic readings was 85 mm. Hg. No observations were made with regard to arm-leg differences.

Aneurysm.—A definite aortic aneurysm, proven by X ray examination, was found to be present in nine cases, in all of which the W.R. was positive, and the electro-cardiographic left-sided preponderance was very marked indeed.

Lungs.—No lung changes were found in these cases, except the basal crepitations indicating œdema from cardiac failure, and these only in such cases as died in hospital.

Œdema.—The same may be said of œdema generally, and no history of recurrent œdema of ankles was obtained from these patients except in two cases complicated by lesions of other valves and known to be suffering from auricular fibrillation.

Of the three cases which died of slow progressive general anasarca no history of previous cardiac failure was obtainable. One patient, who had advanced renal disease, was said to have occasional variable œdema of the ankles.

Vomiting.—Vomiting was only complained of by patients when there was evidence of grave cardiac disability, and its appearance heralded the end. It occurred—but only as a very late event—in three out of the four patients who died suddenly. One patient ate his breakfast prior to coming to hospital, on his weekly visit, said he felt sick, immediately vomited, and fell dead.

Liver.—Hepatic enlargement was only found when there was other evidence of cardiac failure, except in one case where an alcoholic history, the consistence of the organ and its freedom from tenderness, seemed to justify the additional diagnosis of hepatic cirrhosis.

Spleen.—The spleen was found enlarged and palpable in nine cases. In five of these malaria was known to have occurred in the past, one patient was known to have hepatic cirrhosis, which condition was thought to account for the enlargement. Four cases were diagnosed as subacute bacterial endocarditis, and one as ulcerative endocarditis. In this connexion the frequency with which a past malarial history is obtained in these cases of subacute endocarditis appears to be greater than the fortuitous coexistence of the two diseases would warrant. There seems evidence for the belief that malaria in aortic valve lesions of old standing is liable to determine the onset of this complication.

Eyes.—Routine examination of the fundus oculi was made and pulsating retinal vessels were occasionally observed but in six cases definite retinal changes were found—1 bilateral syphilitic choroiditis, 1 bilateral optic atrophy (tabetic), 2 retinal hæmorrhages (renal; both cases dead), 2 retinal hæmorrhages (in subacute endocarditis; both cases dead).

Kidney.—The renal function was investigated by the urea-concentration test in 39 cases. Response was found to be below normal in eight cases—3 of renal disease, 1 with auricular fibrillation, and 4 with red blood cells also present, and thought to be cases of subacute endocarditis.

Tenderness.—Hyperalgesia was investigated in all cases and in only seven was any tenderness elicited, although so many of the patients complained of præcordial pain or discomfort. In two cases which gave a history resembling, if not identical with, angina, both showed marked tenderness. Two other cases, both with large hearts, showed a tender spot at the left seventh costochondral junction. The rest had only slight præcordial tenderness.

Exertion.—In nine cases the exercise tolerance was quite good, and these patients possessed little or nothing in the way of symptoms except one patient, a tabetic. The rest of the patients had a very poor response to exertion, becoming distressed and breathless on very slight provocation.

X ray.—The routine radiographic examination which was made gave most valuable information, both as finally deciding the presence or absence of an aneurysm and also in corroborating the clinical findings with regard to the cardiac size and shape. The typical aortic form of heart was reported in almost every case.

Other Diseases and Mental Change.

Other diseases were found to coexist in these patients, but always in some way related to the cardiac condition. Thus, to recapitulate: 1 ulcerative endocarditis, 4 subacute endocarditis, 1 active syphilis, 1 tabes, 1 hepatic cirrhosis, 2 nephritis. In no case was any mental change noticed in the patients except in the tabetic, who constantly professed himself very fit indeed in spite of his manifestly parlous state. He showed no other indications of G.P.I. beyond this and his optic atrophy.

Diagnosis.

Very little evidence is available to show how frequently errors of diagnosis are made in aortic disease. Several cases had murmurs difficult to hear either by direct auscultation or with any form of stethoscope. Much help was obtained by bending the patient well forward and listening along the aortic course, but it is essential to keep a firm grip on these patients, as their vertigo is always increased by this manœuvre, and they are very liable to fall. In one case at least a diagnostic error was probably committed, and this in spite of the fact that the possible fallacy was thought of and discussed. The patient had advanced renal disease with retinal hæmorrhages, urgent dyspnœa, and signs of a very large pericardial effusion. There was a systolic murmur and an impure first sound at the apex. Diastolic murmur was not audible at the base, but was heard at the fifth left costal cartilage, soft and blowing in character. The second sound was easily heard. The possibility of pericardial friction was discussed, but ruled out on account of (*a*) the character of the sounds, and (*b*) the size of the effusion. Operation was undertaken later to remove the pericardial fluid in the hope of relieving the respiratory distress. This was to some extent successful, but the patient died four days later. At the post-mortem there was some sclerosis of the aortic valve segments, but no regurgitation to the water test.

Circulatory Conditions.

Much help was obtained from electrocardiographic tracings, conditions being revealed which could not otherwise have been made out.

P.R. interval.—No case of heart-block was found in this series, but the P.R. interval exceeded the normal in four cases—one of rheumatic disease with left-side preponderance who remains well, two of arterio-sclerosis (one died from heart failure, the other shows retinal hæmorrhages), and one case of subacute endocarditis who died suddenly.

Inversion of T.—The inversion of T in lead 2 in the absence of digitalis administration was found in four cases—1 syphilitic aortic disease with right-sided dominance, 1 rheumatic disease with left-sided preponderance, cardiac asthma and angina, 1 arterio-sclerosis, and the case of pericardial effusion which showed no aortic incompetence at post-mortem. All four of these cases were clinically very ill.

Q.R.S. interval.—No case in this series was found showing a Q.R.S. complex exceeding the normal period.

Left-side preponderance.—It was thought that if a left-sided hypertrophy were the response to mechanical aortic damage, its absence should indicate a want of recuperation on the part of the patient; except where a coexisting mitral stenosis might occasion a right-sided preponderance (R.S.P.). Investigation along these lines gave the following results: General condition remarkably good in 8 cases. R.S.P., 3; L.S.P., 3; no change, 2. General condition remarkably bad in 11 cases. R.S.P., 2; L.S.P., 8; no change, 1. Obviously the degree of regurgitation would form a large factor in the resulting hypertrophy. Estimation of the grade of regurgitation was attempted with the following results: Slight, 15 cases: L.S.P., 6; R.S.P., 5; no change, 4. Grave, 25 cases: L.S.P., 17; R.S.P., 4; no change, 4. Of those cases showing a grave degree of regurgitation and no change in the electrocardiogram two are already dead. Among the tracings a left-sided preponderance was found 21 times. In 15 of these the cardiac enlargement was marked and aortic in type, in 2 cases the clinical enlargement was slight, while in 4 cases no enlargement was made out. Of these 21 cases 5 had a presystolic murmur; 8 were thought to be rheumatic, 9 syphilitic, and 4 arterio-sclerotic.

Right-side preponderance.—Nine such cases were found; 4 had a presystolic murmur, 5 were considered rheumatic in origin. There was no evidence for regarding the R.S.P. cases as more serious than those showing L.S.P.

P.-wave or auricular wave.—An examination of the P. wave as regards magnitude and duration gave no help as regards the presence or absence of true mitral stenosis. Seventeen cases gave a P. deflection exceeding 3 mm. in lead 2, and of these only 6 had a presystolic murmur. In 5 the P. wave was split, but only one had a presystolic murmur, and

only one a history of rheumatism. Of the 17 cases, 6 had a rheumatic history, 5 a positive W.R., and 5 arterio-sclerosis.

Conclusions.

The prognosis in aortic disease remains almost as difficult a problem to-day as it was years ago. Nevertheless modern methods do give invaluable help in certain cases. Pathological increase in the P.R. interval or the duration of the Q.R.S. complex yields information as to myocardial damage which could not be arrived at by other means or could only be guessed at without any definite proof—e.g., P.R. interval increase, four cases, two already dead. Inversion of T. in lead 2, four cases, one already dead, and two others seriously ill. But this matter of "looking for a sign" remains as unprofitable in this century as in any other; it is only by utilising every method of investigation, old as well as new, that a correct estimate is likely to be arrived at in these difficult cases.

Active infections.—The careful and repeated examination of the urine for red blood cells, the systematic search for petechiæ, enlargement of the spleen, pallor and clubbed fingers—as indicative of the subacute bacterial endocarditis described by Libman and by Horder—is perhaps the most important procedure in the whole clinical examination of the patients, and only to a less extent, because less frequent, in all cardiac cases.

Etiology.—Arteriosclerosis and renal disease, long regarded as ætiological factors, also demand special investigation, more particularly as regards renal function and retinal hæmorrhages. The W.R. and X ray examination both give invaluable help, especially as regards the occurrence of aneurysm, which, although present, may give no signs or symptoms at all.

Correlation of findings.—The correlation of all the findings will probably point the way, and each factor follow the expected line; yet in a certain number of cases this will not be so, and explanation of the anomaly may be extremely difficult. Where the size of the heart does not appear to correspond to the degree of regurgitation, as judged by the collapsing character of the pulse, difference in systolic and diastolic pressures, presence or absence of aortic second sound at the root of the neck, and the presence of L.S.P. in the electrocardiogram, the possibility of an adherent mediastino-pericarditis must be borne in mind; it was thought to be a possibility in only one case of this series. Of the 40 cases fully investigated, all the facts arrived at followed the expected line in 31, but in 9 cases the findings did not correspond in some particular. Of these nine cases 3 are already dead, 1 has an active endocarditis, 1 probably an adherent pericardium, and the other 4 cannot be at present explained. Those factors which herald a lethal result have already been sufficiently insisted upon, but it would seem that cases which show a want of correspondence in all the findings of a routine examination should also be regarded as of serious outlook.

I wish to thank Dr. Arnold Renshaw, pathologist, and Dr. J. M. W. Morison, radiologist, for much help in routine work, and the Pathological Department of the University of Manchester, whose generous grant made this work possible.

ROYAL SUSSEX COUNTY HOSPITAL, BRIGHTON.—In the last two decades great extensions have been made to this hospital, but circumstances have till now prevented a corresponding extension in the accommodation for nurses. The original nurses' home could provide lodging for 43 of the nursing staff; now the staff numbers 78. As far back as 1907 the matter became pressing, the provision of accommodation in rented houses involving discomfort to the staff in addition to being a costly procedure. In 1912 the governors had plans prepared for an extension of the original nurses' home; a special appeal for funds was made early in 1914, but the project had then to be abandoned, and it remained in abeyance until 1919, when a legacy of over £20,000 was left by Miss Walker. This legacy was treated as capital, and at a cost of £23,000 accommodation has now been found for 88 nurses. The extension to the nurses' home was opened by Princess Mary on Nov. 22nd, on the occasion of her first visit to Brighton in an official capacity. She also presented badges to nurses.

ON THE NON-LACTOSE-FERMENTING BACILLI

IN THE STOOLS OF HEALTHY AND UNHEALTHY UGANDA NATIVES.

(Preliminary Observations.)

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THE establishment of a laboratory in a country where the bacteriological aspects of disease have hitherto received practically no attention entails a great deal of preliminary work in order to arrive at a proper appreciation of the limits of normal health for the community. In Uganda we have to deal with a mixed population of Europeans, Asiatics, and natives, many of whom are strangers in the land and only partially adapted to their environment. The native community includes members of many different tribes, accustomed to different dietetic and climatic conditions, and about whose nosology relatively little is known. In the Uganda Laboratory Report for 1920 a number of Arneth counts were published, which were made with the object of revealing the limits within which variation is compatible with normal health in the various communities. From the little that has been done in this direction it is already clear that considerable care must be used in basing conclusions on this test. The investigations recorded below deal with the non-lactose-fermenting Gram-negative bacilli present in the fæces of healthy and abnormal inhabitants of Uganda—coloured and white. Attention has been confined to non-lactose fermenters, because most of the recognised pathogenic intestinal organisms belong to this category. The work of Douglas and Colebrook and others for the Medical Research Committee has afforded a model upon which the inquiry was roughly moulded, and the results obtained are presented in the briefest manner possible in view of the paucity of the material examined and the relative incompleteness of the examination.

The observations here recorded represent the work of one session terminated by my departure on leave. During my absence the majority of the strains described below will be maintained on agar, to be re-examined when occasion offers. The small number of serological tests applied up to date is explained by the press of routine and other work on the limited laboratory staff. No absorption tests were possible owing to the absence of a suitable centrifuge, but it is hoped to overcome this difficulty next session. It was necessary also to dispense with pathogenicity tests, as the supply of animals was inadequate. The organisms isolated have been grouped provisionally according to the principal sugar reactions. It is realised that the sugar fermentation reactions of an organism do not constitute an infallible means of differentiating species, but they supply a convenient expedient in inquiry of this nature. At present Uganda is fortunate in being relatively free from enteric disease, but the knowledge that must accrue from an investigation of this nature will prove of value should a demand for a prophylactic vaccine arise in the future. It will be interesting to see whether the serological races indicated in some of the groups below will survive the test of absorption. The recognition of serological affinity among strains giving the reactions of Morgan's bacillus No. 1, and isolated in Uganda and Kenya Colony respectively, may prove of some significance in view of Pirie's observations on this organism in Nairobi.[1]

Technique.

A small portion of the stool was thoroughly emulsified in sterile distilled water in a test-tube, and after the emulsion had stood for some 15 minutes a loopful was spread on a MacConkey plate. Only one plate was used for each direct plating, and at times only half a plate. At the same time two or three loopfuls of the emulsion were inoculated into peptone-water tubes containing 0·4 and 0·6 c.cm. of a 1/10,000 solution of brilliant green per 10 c.cm. of medium

These tubes were incubated for 18 hours, and a loopful was then plated on MacConkey. Time did not admit of the use of the brilliant-green method in all cases. It would appear that this method leads to an increase in the number of non-lactose-fermenters isolated. The control experiment of incubating plain peptone-water tubes for the same period was, however, not performed. From the MacConkey plate colonies were picked off and planted into glucose peptone water, and, after 24 hours' incubation, a loopful from the glucose tube was plated on MacConkey, and a single colony selected from this final plate for complete investigation. All sugar tubes were sterilised by heating them to 100° C. on three successive days for 15 minutes. The sugars used were glucose, mannite, maltose, saccharose, and dulcite, and were supplied by Baird and Tatlock, litmus being used as the indicator. The sugars were present in 1 per cent. solution, except in the case of lactose, which was added to 3 per cent. All sugar tubes were incubated for three weeks before they were finally discarded; this revealed the presence of numerous late-lactose-fermenters, which on MacConkey and for the first few days in the 3 per cent. sugar tube produced no recognisable fermentation of lactose.

Indol.—Tested for by the ether-extraction method. The Voges-Proskauer test was applied to some of the organisms, a three-days' growth at 37° C. in glucose broth being well shaken up with a 10 per cent. caustic potash solution. No positive results were obtained with this test with any of the organisms described below; it is possible that the potash solution was not sufficiently strong.

Motility.—Investigated in hanging-drop preparations, 18-hour broth cultures being used. In certain doubtful cases control preparations were made in 5 per cent. carbolic acid.

Gelatin.—Twenty-five per cent. gelatin was employed, to ensure the medium remaining solid at laboratory temperatures. Tubes were kept under observation for six weeks.

Lead acetate agar.—Slopes were inoculated between the agar and the glass. Blackening was observed both in the medium and in the surface growth which developed at the point of insertion of the needle. It appears advisable to add the acetate as late as possible to the cooling agar, many batches proving useless in which the temperature of the agar appeared to be the disturbing factor. A time-limit seems necessary in employing this test, as many organisms will produce blackening if left for three or four days on the agar.

All agglutination tests were performed by the macroscopic method with unit volumes of 0·2 or 0·3 c.cm. Normal human serum controls were always employed. The tubes were incubated in a water bath for two hours at 37° C., and then for two hours at 56° C., confirmatory readings being taken overnight. Pipettes with rubber teats, graduated to 0·1 and 0·01 c.cm., were used in making the dilutions. Rabbits were used for the preparation of antiserums, the method of Chick and Dalyell being followed with excellent results.[2] In testing these serums a dilution of 1/4000 was the highest used, complete flocculation at this titre being regarded as sufficient indication for bleeding the rabbit. These locally-prepared serums, preserved with 0·1 per cent. carbolic, retained their efficacy for over a year, even under the inadequate conditions of storage prevailing at the laboratory.

In all, the stools of 38 normal natives have been examined, samples being taken on three successive days in the majority of the cases. Specimens were examined as fresh as possible—usually within one to two hours after the passage of the stool. As "normals" were considered healthy individuals, or hospital patients suffering from mild venereal disease or from minor ailments. Stools from 26 natives suffering from typhoid or dysenteric disease were similarly dealt with. Stools from 12 abnormal Europeans, all of whom were suffering from some kind of intestinal disturbance, were also examined, and one Indian stool from a case of typhoid.

The various groups of organisms will now be considered, and the relative frequency with which each of these groups occurred will be shown at the end of this section in Table II. For the agglutination tests in connexion with Groups 1 and 2 only two dilutions were used, of 1/40 and 1/500, the object being to obtain a rough idea of the serological affinities of the various strains with a minimal expenditure of time. The main characters of the groups are indicated in the subjoined Table I., following upon which will be found a brief account of the serological tests applied to each group. Each case receives a reference number, the various colonies isolated being distinguished by letters. Thus 113a, b, and f, all come from the same individual, No. 113.

Group 1.—Found in 2 abnormal natives, 10 normal natives, and 2 abnormal Europeans. Rabbits were prepared against three strains of organisms of this group—viz., 232e, 234g, and 247c—and the other strains were tested against these three agglutinating serums. Serum 232e gave complete agglutination at 1/500 with strains isolated from six different natives, and gave complete agglutination at 1/40 with a strain from a seventh individual, the 1/500 dilution with this last strain proving negative. With Group 1 strains from eight other natives, normal and abnormal, no agglutination resulted at either dilution. Serum 234g gave complete agglutination at 1/40, nil at 1/500, with a strain from a normal native. With 14 other strains of Group 1, isolated from different natives, normal and abnormal, no agglutination occurred at either dilution. Serum 247c gave complete agglutination at 1/500, with strains from four different normal natives. With eight other strains from different normal natives no agglutination occurred at either dilution.

These experiments showed also that Nos. 232e and 247c were nearly related, if not identical, strains, neither of which showed any serological affinity to No. 234g.

It is thus plain that at least two distinct serological races are included in Group 1, which is of fairly frequent occurrence in normal natives' stools in Uganda. Morgan found organisms of this kind occurring in as many as 11·7 per cent. of his cases, but they always gave a positive indol test.[3]

Group 2.—Found in 7 abnormal natives, 20 normal natives, 3 abnormal Europeans, and 1 Indian. Rabbits were prepared against two strains of this type of organism—viz., 234f and 247d—and the other strains were tested against these serums. Serum 234f gave complete agglutination at 1/500 with one strain (from a different individual); also complete agglutination at 1/40, trace at 1/500 with a strain from another individual; also complete agglutination at 1/40, nil at 1/500 with a strain from a third individual. Serum 247d gave complete agglutination at 1/40, nil at 1/500, with strains from two different individuals.

These experiments showed also that Nos. 234f and 247d have totally different serological affinities. Under the heading "blood cultures" further observations are made concerning this group of organisms.

Group 3.—Found in 2 abnormal natives and 3 normal natives. Rabbits were prepared against two strains, 100H and 113d, which came from a native typhoid and a native dysentery case respectively. Neither serum had any action with the heterologous organism. Serum 113d gave no agglutination with any of the heterologous strains tested, including five sent to me by the pathologist at Nairobi. Serum 100H gave interesting results. With two out of the three strains isolated from Uganda natives this serum gave complete agglutination in 1/1280. These two strains came from different individuals. Complete agglutination at 1/1280 (highest dilution employed) also resulted with one of the five Nairobi strains of Morgan's bacillus, the other four strains giving negative results at all dilutions.

In no case has the serum of the individual, normal or abnormal, from whose stool Morgan's bacillus has been isolated in Uganda given any agglutination with his own strain from 1/20 upwards. All the above agglutination tests were controlled with normal human serum. The third Uganda strain, 261a, isolated from the stool of a normal native, gave no response with either serum, and produced acid and clot in milk. This organism is therefore not to be regarded as a typical Morgan No. 1, and is accordingly not included in the percentages of Table II. Morgan found his organism in as many as 55·8 per cent. of his cases.[3] The recognition of serological affinity between three strains of Morgan's bacillus from natives, one from a native typhoid case in Uganda, one from a normal Uganda native, and the third from a dysentery outbreak in Nairobi is interesting.[1] The rôle played by this bacillus as a pathogenic agent is still doubtful, though workers for the Medical Research Committee have of late advanced reasons for regarding it as of some significance. The scanty evidence put forward above is insufficient to warrant any opinion on this point.

Group 4.—Found in 6 abnormal natives, 1 normal native, and 3 abnormal Europeans. Nos. 113a, 262, 257, and 174 gave no agglutination with either their host's serums or with a Burroughs and Wellcome (B. and W.) Flexner serum or with two locally-prepared Flexner serums. Nos. 211, 212, 213 gave no agglutination with the patients' serums or with B. and W. Flexner and typhus serums. All three organisms gave complete agglutination at 1/320 (highest done) with each of two monovalent serums prepared locally against two strains of Flexner bacillus derived from the Lister Institute.

No. 128 gave complete agglutination at 1/160, traces at 1/640, with the patient's serum, and complete agglutination at 1/80, traces at 1/160, with the serum of an adjoining dysentery case. A rabbit was prepared against No. 128, and its serum gave complete agglutination to 1/320 (highest employed) with the two above-named Flexner strains from the Lister Institute. Bacillus No. 185, isolated from a native with clinical typhoid whose serum agglutinated *B. typhosus* in high titre, differed from the other members of the group by producing acid and no gas in dulcite and in turning milk faintly acid. Indol test positive. Other strains from the same stool produced in addition acid in lactose. These organisms were examined repeatedly for motility, but on no occasion was genuine motility seen. Organisms with the characters of Groups 1 and 2 were found in the same stool.

Group 5.—Found in 4 abnormal natives. No. 77c was agglutinated up to 1/160 by the patient's serum, the particles being fine throughout the series. The others of the group were not affected by their host's serums from 1/20 upwards. Nos. 77c, 96d, 31a, and 25 gave no agglutination response with B. and W. Flexner and typhosus serums. A rabbit was prepared against No. 25, and the high-titre serum so obtained tested against the other three members of the group. Nos. 77c and 96d and 31a gave no response, but No. 31b gave complete agglutination at 1/320, and particles easily visible to the naked eye at 1/160 with this serum. No. 31 is interesting. When first isolated the strain showed no action on saccharose, but in six months' time certain colonies were found to ferment this sugar. This race, known as No. 31b, was also distinguished from No. 31a by agglutinating completely at 1/320 with the serum of a rabbit prepared against No. 25.

Group 6.—Found in 1 abnormal native, 1 normal native, and 4 abnormal Europeans. No. 50 agglutinated completely to 1/1280 with the patient's serum. An organism, No. 49a, similar in general reactions to No. 50, isolated from the urine of the same patient, also agglutinated to 1/1280 with patients' serum. Controls with normal human serum negative. None of the other members of the group were agglutinated by either the host's serum or by B. and W. para A, para B, and enteritidis serums, or with a locally prepared para C serum from 1/40 upwards.

Group 7.—Found in 3 abnormal natives, 1 normal native, and 1 abnormal European. Corresponds to Douglas's Group V.[4] The organisms of this group all gave negative results with B. and W. para A, para B, and enteritidis serums, and also with the host's serum, from 1/40 upwards.

Group 8.—Found in 3 abnormal natives, 3 normal natives, and 1 abnormal European. Corresponds to Douglas's Group X. No. 29a gave almost complete agglutination at 1/80, traces at 1/160, with B. and W. enteritidis serum. None of the other members of the group gave any response from 1/40 upwards with either the host's serum or with B. and W. para A, para B, or enteritidis serums.

Group 9.—Found in 1 abnormal native, 1 normal native, and 1 abnormal European. Corresponds to Douglas's Group IV. No organism of this group gave any response with either the patient's serum or a locally prepared para C serum, or with B. and W. para A, para B, and enteritidis serums.

TABLE I.

Description of organism.	Motility.	Sugar fermentations. Glucose.	Mannite.	Maltose.	Saccharose.	Dulcite.	Indol.	Milk.	Lead acetate.	Neutral red.	Voges-Proskauer	Gelatin.	Provenance of organisms. (N. = native, E. = European.)
GROUP 1 .	+	A	O	O	O	O	O	O or alk.	O	O	O	O	—
GROUP 2 .	+	O	O	O	O	O	O	O or alk.	O*	Yellow	O	O	—
GROUP 3 .	+	AG	O	O	O	O	+	O	Sl. +		O	O	—
GROUP 4.													
113a. . .	−	A	A	O	O	O	O	O	+	Pink	O	O	N. dysentery case.
257 . . .	−	A	A	O	O	O	O		O			O	Normal N.
262 . . .	−	A	A	O	O	O	O	A/alk.		Pink		O	E., little blood and mucus.
174 . . .	−	A	A	O	O	O	+	A/alk.	Sl. +	Pink		O	E., diagnosis hepatitis: no diarrhœa.
211–213. .	−	A	A	O	O	O	+	A/alk.	O	Pink	O	O	N. with typical bacillary dysentery.
128 . . .	−	A	A	A	O	O	+	A/alk.	O	Pink	O	O	Recovery.
GROUP 5.													
77c . . .	+	A	A	A or O	O	O	O	Alk.	O		O	O	Abnormal N.: dysentery.
96d . . .	+	A	A	O	O	O	O	Alk.	+			O	—
31a & b .	+	A	A	A	A or O	O		A/alk.	+	Pink	O	O	N.: clinical typhoid.
25 . . .	+	A	A	A	O	O			+	Pink			
GROUP 6.													
50 . . .	−	AG	AG	AG	O	AG	+	Alk.			O	O	Abnormal E.
51 . . .	−	AG	AG	AG	O	AG	+	Alk.	+	Pink	O	O	
89 . . .	+	AG	AG	AG	O	AG	O	Alk.			O	O	Abnormal N., typhoid.
I.A. . . .	+	AG	AG	AG	O	AG	+		Sl. +	Pink	O	O	
224 . . .	+	AG	AG	AG	O	AG	+					O	Abnormal E.
205 . . .	+	AG	AG	AG	O	AG	O		O			O	Normal N.
97b . . .	+	AG	AG	O	O	AG	+	AC	+			O	Abnormal E.
GROUP 7.													
158b . .	+	AG	AG	AG	AG	O	O	AC	+			L	Normal N.
113f . .	+	AG	AG	AG	AG	O	+	AC	+		O	L	
94d . . .	+	AG	AG	AG	AG	O	O	AC	+			L	—
77d . . .	+	AG	AG	AG	AG	O	+	Alk.				L	Abnormal N.: dysentery.
97c . . .	+	AG	AG	AG	AG	O	+	AC	+			O	—
113b . .	+	AG	AG	AG	AG	O	+	Faint A	+	Pink	O	L	Normal N.: "climbs" on agar slope.
GROUP 8.													
204 . . .	+	AG	AG	AG	AG	AG	+		+	Pink		O	Normal N.
29a . . .	+	AG	AG	AG	AG	AG	+	AC digestion		Fluor.	O	O	Abnormal N.: typhoid.
76a . . .	+	AG	AG	AG	AG	AG	+	A/alk.	Sl. +			O	Abnormal N.: dysentery.
234 . . .	−	AG	AG	AG	AG	AG	+	O	+	Pink		O	Normal N.
203 . . .	−	AG	AG	AG	AG	AG	+			Pink		O	
B.I. . . .	+	AG	O	AG	AG	AG	+	AC	Sl. +		O	O	Abnormal N.: typhoid.
GROUP 9.													
85 . . .	+	AG	AG	AG	O	O	+	Alk.	+			O	Abnormal N.: typhoid.
97c[2]. . .	+	AG	AG	AG	O	O	+	AC	+			O	Abnormal E.
156a . .	+	AG	AG	AG	O	O	+	A	+	Pink		O	Normal N.
201 . . .	+	AG	AG	AG	O	O	+		+	Pink		O	
GROUP 10 .	+	O	O	O	O	O						L	Pyocyaneus: green on agar.

* Except organism from European W.: see clinical description of cases, (*b*), and various paragraphs following.
O = No essential visible alteration of the medium.
+ = Motility, indol-production, or blackening of the lead agar respectively.
A., acid; alk., alkali: G., gas; C., clot: L., liquefaction of the gelatin; Sl., slight.

Group 10.—Found in 2 abnormal natives, and 2 normal natives. A high-titre agglutinating serum prepared locally against a *B. pyocyaneus* strain isolated from blood of native S. (cf. blood cultures below) agglutinated fully to 1/640 (highest dilution used) with two strains from two different normal natives.

TABLE II.—*Showing Percentage Occurrence of Various Groups in the Stools Examined.*

Group.	In abnormal natives (total 26).	In normal natives (total 38).	In abnormal Europeans (total 12).	In abnormal Indians (total 1).
1	7·6	26·3	16·6	—
2	26·9	52·6	24·9	—
3	7·6	5·2	—	—
4	22·8	2·6	24·9	—
5	15·2	—	—	—
6	3·8	2·6	33·2	—
7	11·4	2·6	8·3	—
8	11·4	7·8	8·3	—
9	5·2	3·8	8·3	—
10	5·2	3·8	8·3	—

Blood Cultures.

A small number of blood cultures were performed in connexion with the above investigations. On three occasions Gram-negative bacilli were recovered —twice from native S., whose disease resembled mild typhoid, and once from European W., who suffered from a low enteric-like fever lasting three weeks without any characteristic bowel symptoms.

Technique.—Blood was drawn from a convenient vein in the arm by means of a sterile all-glass syringe. At first the citrated blood was added to broth—with or without the trypsin suggested by Douglas[5]—and to sterile ox bile. Latterly the clot method was employed. The blood was allowed to clot in the test-tube, the serum removed, and the clot carefully washed with sterile saline. The washed clot was subsequently broken up with a sterile glass rod, and the fragments added to 2 per cent. sodium taurocholate in distilled water. All the three positive results were obtained by the clot method.

Clinical Description of Cases.

(*a*) *Native S.* (male). The following description was kindly supplied by Dr. W. L. Webb, medical officer, Kampala.

"S. was admitted to the gaol hospital on Oct. 16th, 1920, apparently on the first day he had felt indisposed enough to claim exemption from work. Temperature on admission, 100° F., rising that evening to 103° F. Blood negative to malaria; tongue coated almost completely with white fur; no enlargement of spleen could be made out, no rash was seen; a tendency to diarrhœa during first ten days. Stools typical of typhoid throughout. Temperature reached normal on fourteenth day of disease. The man was weak, and lost weight during his illness, but during the whole time was mentally alert. S. was transferred from Masindi to Kampala gaol during January, 1920. During his stay in gaol he has performed ordinary prison duties, cultivation, wood and water carrying, &c. No previous illness is noted on his sick sheet."

The patient's serum on Oct. 18th, 1920, gave no agglutination with *B. typhosus*. The available charts showed a gradual rise to 105° during the first nine days followed by a return to normal during the next four days. Unfortunately the temperature chart covering the date of the second positive blood culture is not available at the moment of writing, but to the best of my recollection a slight secondary rise occurred for a few days. At all events no marked rise occurred in connexion with the presence in the blood of *B. pyocyaneus*, a state of affairs in striking contrast to the usual course pursued in pyocyaneus bacillæmia in whites.

(*b*) *European W.* (female). The patient had been indisposed for a few days before admission. Bowels never loose throughout the illness; indeed, there was a tendency towards constipation. Tongue furred. Slight general tenderness to pressure on abdomen. Headache and general malaise were the main symptoms complained of, and the patient remained bright and comparatively cheerful throughout her stay in hospital. No rash was seen at any time. Patient's serum was tested on Jan. 14th, 1921, against *B. typhosus*, *B. para A* and *B*, *para C*, *M. melitensis* and *para-melitensis*, and *B. proteus* with negative results. On Feb. 16th, 1921, the serum was again negative to *B. typhosus*, *para A* and *B*, from 1/20 to 1/320 dilution. Patient ultimately discharged from hospital in excellent health. For the first 18 days after admission the temperature remained between 99° and 101°, on only four occasions passing 101° by a point or two. On the 11 following days the evening temperature reached 99°.

Description of the Organisms and their Serological Reactions.

(*a*) *From native S.* First positive blood culture performed on Oct. 21st, 1920. On the MacConkey plates inoculated from the 2 per cent. sodium taurocholate tube, and also from a glucose broth tube to which another portion of the clot had been added, a bacillus, No. 190f, was isolated in pure culture. This bacillus gave all the reactions of Group 2. The growth on agar tended to become sticky after a few days, and a pellicle was often noticeable in the sugar tubes. A second positive blood culture was obtained from native S. on Nov. 7th, 1921, when organism 190m, giving the reactions of *B. pyocyaneus*, was isolated in pure culture.

Serological Tests.—(1) With organism No. 190f. A rabbit was prepared against No. 190f, and a high titre serum was obtained which we will call serum 190f. On Oct. 29th and Nov. 7th, 1920, the patient's serum gave no agglutination with No. 190f from 1/20 upwards. Bacillus 190f was not agglutinated in any dilution, from 1/20 upwards, with any of the following serums: B. and W. *typhosus para A*, *para B*, a high titre serum prepared against the organism isolated from European W. (cf. infra), and the serum of European W. Serum 190f gave no agglutination from 1/20 upwards with organisms of Group 2 isolated from the stools of ten different natives, normal and abnormal; but it agglutinated completely to 1/320 (highest dilution tried) No. 236d, a member of Group 2, which was isolated from the stool of European W.

(2) With organism No. 190m. The patient's serum gave no agglutination response with No. 190m a few days after its isolation. A rabbit was prepared against No. 190m and a high titre serum, which we will call serum 190m, was obtained. This serum 190m gave rapid and complete agglutination to 1/320 (highest dilution tried) with Nos. 115a and 143c, which were typical pyocyaneus strains isolated at different times from the stools of normal natives.

The case of native S. is of interest in that two different organisms were isolated from the patient's blood on different occasions. On each occasion the organism found was present in pure culture. On the day on which No. 190f was isolated, clot cultures were made from nine other natives in the same ward, all of whom were suffering from acute Flexner dysentery (cf. Group 4, Nos. 211–213 of Table I.). The same technique was employed for all the cases, a sodium taurocholate and a glucose broth tube receiving portions of the clot from each individual. In eight of the nine dysentery cases both tubes remained sterile. In the ninth case the glucose broth tube was contaminated with a Gram-positive motile bacillus, the bile-salt tube remaining negative. On several other occasions in which clot blood cultures were made, the tubes remained absolutely sterile. In view of these control experiments, together with the unlikelihood of *B. fæcalis alkaligenes* obtruding as a contamination during carefully conducted blood culture experiments, I consider that Cases S. and W. are genuine examples of an invasion of the blood by the organisms isolated.

(*b*) *From European W.*—Isolated on Jan. 14th, 1921, by adding broken up washed clot to 2 per cent. sodium taurocholate in distilled water. The organism appeared in pure culture, and gave the reactions of Group 2, save that it rapidly blackened lead acetate agar. Clot blood cultures performed on patient W. on two other occasions, within ten days of the isolation of bacillus "W," proved sterile.

Serological Tests with Bacillus "W."—A high-titre rabbit serum was prepared against the organism. This serum gave no agglutination in any dilution from 1/20 upwards with any of ten strains of Group 2 isolated from ten different natives, normal and abnormal. With No. 232a (a Group 2 organism from the stool of a normal native) this serum gave complete and rapid agglutination up to 1/320 (highest dilution used). Bacillus No. 232a differs from bacillus W. by producing no blackening on lead acetate agar. The serum of patient W. gave no agglutination on two different days, from 1/20 dilution upwards, with either bacillus W. or No. 190f (from native S.), or with bacilli of Group 2 isolated from the stools of four different normal natives, one abnormal European, and the patient's own stool (No. 236d).

Organisms Isolated from the Stools of Patients S. and W.

(*a*) CASE S.—On Oct. 29th, 1920, bacillus No. 192 was present in considerable numbers in the stool, which was of pea-soup character. This organism conforms with Group 1, save that it appears to be non-motile, that milk is turned acid (this requires confirmation), and that neutral-red is turned pink. It was thought that this bacillus might be a typhosus strain with some of its characters masked, but no response was given with either a B. and W. *typhosus*

serum or with a locally-prepared high-titre *typhosus* serum. On Oct. 29th, 1920, and on Nov. 7th, 1920, the patient's serum gave no agglutination from 1/20 upwards with No. 192.

(*b*) CASE W.—A large proportion of late-lactose-fermenters were always present in both the direct and brilliant green plates from this patient. On one occasion No. 236d was isolated in practically pure culture on a brilliant green plate. No. 236d shows the typical characters of Group 2, lead acetate agar not being blackened. On several occasions the patient's serum showed no agglutination from 1/20 upwards with 236d. As mentioned above, serum 190f gave complete agglutination with No. 236d in two hours at 37° up to 1/320 (highest dilution used).

Thus from the blood of two patients—one native and one European—organisms with the general reactions of *B. fæcalis alkaligenes* have been recovered. These two organisms are quite distinct serologically, and while one (W.) blackens lead acetate agar in 18 hours, the other (190f) does not. That this latter characteristic has, however, no deep significance is indicated by the fact that while serological tests indicate close affinity between organisms 232a (from stool of normal native) and bacillus W. (from blood of European W.), No. 232a does not blacken lead acetate agar.

Conclusion.

The observations recorded in this paper, limited though they are, show that organisms assignable to Groups 1 and 2 of Table I. are relatively common in the fæces of normal natives in Uganda. The recovery on two occasions of organisms of Group 2 from the blood of patients suffering from typhoid-like disease, but whose serums give no agglutination with typhoid or paratyphoid bacilli, indicates that organisms of the *B. fæcalis alkaligenes* type may play an important part in the production of enteric disease in Uganda. In the event of a prophylactic enteric vaccine being called for in the Protectorate this type of organism must be considered. The existence within the limits of Group 2 of races showing no serological relation to one another must also be borne in mind. The work of Shearman [6] and Hirst [7] is interesting in this connexion.

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MANCHESTER EAR HOSPITAL.—The sixty-fourth annual report shows that 5690 new patients were treated, nearly the same number as last year; the in-patients numbered 512, and the operations 891. Patients are sent to this hospital from as far afield as Hereford and even the Isle of Man.

CARE OF THE MENTALLY DEFECTIVE.—The Central Association for the Care of the Mentally Defective announce special lectures and an exhibition to be held during the tenth annual conference of Educational Associations at University College, Gower-street, London, W.C., from Jan. 2nd to the 6th, 1922. On Monday, Jan. 2nd, at 5 P.M., Miss Lucy G. Fildes will lecture on the Training of Teachers for Mentally Defective and Backward Children and Special Methods of Teaching. On Jan. 4th, at 10 A.M., Miss K. L. Marsden will speak on the Organisation and Scope of Backward Classes, and on Jan. 5th, at 5 P.M., the Possibility of Coöperation between the School Medical Officer and the Teacher in the Training of Sub-Normal and Mentally Defective Children will be the subject of an address by Dr. G. A. Auden. Members of the Association are entitled to free admission to the conference. Tickets for all meetings (7*s.* 6*d.*), or for single meetings (1*s.*), will be on sale at the secretary's table during the conference.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF ODONTOLOGY.

A MEETING of this section of the Royal Society of Medicine was held on Nov. 28th, Mr. M. F. HOPSON, the President, being in the chair.

Mr. F. W. BRODERICK read a paper on

THE ENDOCRINE FACTOR IN THE PRODUCTION OF IMMUNITY AND SUSCEPTIBILITY OF THE TEETH TO CARIES.

He said that the ætiology of dental caries had not yet been thoroughly elucidated. W. D. Miller's theory would explain the onset, and Sim Wallace's conclusions would explain the prevalence of caries; but these theories, if true, made it difficult to understand why any teeth should remain sound at all. Mr. Broderick contended that there must be some other factor in question besides the affinity of lime salts for acids, since acids were invariably present in the mouth whatever precautions might be taken. He quoted E. C. Kirk as saying that the susceptibility to dental caries varied at different periods of life; youth was most susceptible, while during adult life a period of immunity commonly supervened. Pregnancy increased the susceptibility. Dental caries occurred in mouths which were well kept both by the use of the tooth-brush and the skill of the dentist. Mr. Broderick said that he had previously put forward the theory that the calcium-utilising power of the body was influenced by the secretions of the endocrine glands. If the enamel formed a complete covering for the tooth, caries could not take place; but if the enamel were removed from even a small area, the tooth was inevitably doomed, unless artificial measures were taken, except in the extraordinary condition of "arrested caries." Clinically there was a wide range of differences in the enamel, in colour, opacity, and hardness; and as a rule, a tooth long erupted was harder than one recently so, although analysis did not reveal any great difference in the lime content.

Calcium Content.

The calcium content of the body occurred in two forms: (i.) fixed in the tissues as inorganic salts, and (ii.) as part of the alkali reserve of the body. The calcium, which was not needed for building or repairing acted as an alkali, gave tone to muscle, helped to govern the function of the heart, and kept up the excitability of nerve tissue. Of the total lime salts ingested, much was excreted without change in the intestine, and part that did enter the blood stream was excreted in the urine, after having perhaps functioned within the body in the ionic form; it was lost for the purpose of tooth-hardening which Mr. Broderick believed was normally a continuous process. Fixation of the ionic calcium in the tooth was as necessary as its absorption from the intestine. It was useless to increase the quantity of calcium in the diet in treating either dental conditions or such diseases as rickets or osteomalacia. The quantity of calcium necessary to keep the body in health was extremely small.

Need of Lime Salts.

Mr. Broderick quoted experimental evidence to show that mere deficiency of lime would not explain the prevalence of dental caries.

The need of lime salts varied at different ages. During growth it must obviously be greater, and during adult life the balance between intake and output was more stable except in women whose calcium metabolism was liable to the rapid alterations of pregnancy and menstruation. During the period of decay the tendency became rather towards calcium saturation.

Balance of Calcium Metabolism.

In health, he said, the balance of calcium metabolism was controlled by the endocrine apparatus. The parathyroids, pars anterior of pituitary, medulla of suprarenal, with possibly the thymus gland, regulated absorption and fixation, while the gonads (ovary and testis) and possibly the thyroid, regulated excretion. In tetany, due to parathyroid insufficiency, the calcium content of the blood had been shown to be much reduced, while in acromegaly, due to hyperplasia of the pars anterior of the pituitary, there was increased deposit of fixed inorganic lime. The inactivity of the gonads during youth helped the growing child to keep and utilise lime, while the absence of ovarian secretion helped the pregnant woman to conserve lime salts for her child. Mr. Broderick had found that as the result of infectious fevers in children (with their concomitant overstimulation and final exhaustion of the endocrine glands) the saliva during convalescence was deficient in alkalinity and in calcium content. By the administration of suitable pluriglandular preparations a rapid recovery of alkalinity and normal calcium content could, in Mr. Broderick's opinion, be brought about. As a result of his researches into the alkalinity of the saliva, he had found that the alkaline index was higher in children than in adults, but the highest index occurred in old people who suffered from pyorrhœa. The alkaline index was generally low in ill-health and where progressive caries existed. It was his belief that the diminished alkalinity of the saliva which predisposed to caries was due to an upset in the balance of the endocrine glands.

The Antagonism of Pyorrhœa and Caries.

The endocrine glands, in the opinion of Mr. Broderick, were also responsible for the rate of utilising calcium ions. He had seen recently two pronounced cases of acromegaly where the teeth had been removed for pyorrhœa. Dentists knew that pyorrhœa and caries were antagonistic conditions, and that the former occurred with hard sound teeth that had withstood caries. In osteomalacia, where the reverse changes took place in the skeleton, the changes in the teeth had been carelessly reported on by medical men. Since bones harden or soften as the result of endocrine derangement: might not the same causal agents underlie the alteration in the consistency of the teeth?

The Bearing of Acidosis on Caries.

The important condition of acidosis had been defined by Sellard as "a diminution from any cause in the reserve supply of the alkaline bases in the blood and other tissues, ... the physico-chemical reaction of the blood remaining unchanged, except in extreme conditions." In the normal metabolism of foodstuffs there was a constant tendency towards the production of acids which were normally got rid of by the lungs as CO_2, by the kidneys in form of acid salts, by neutralisation with ammonia formed in metabolism of proteins, and lastly, by using up the body supply of alkaline salts. The first line of defence against acidosis lay in the carbonates and phosphates of the blood. As regards the carbonates, the reaction was expressed—$NaHCO_3 + HCl = NaCl + H_2O + CO_2$, the neutral salt (NaCl) being excreted by the kidneys, with the loss to the body of its alkaline base. Every acid molecule would thus rob the body of alkali but for the action of the alkaline sodium hydrogen phosphate in the blood, which when reacting with CO_2 reproduced $NaHCO_3$, e.g.:

$$Na_2HPO_4 + H_2O + CO_2 = NaH_2PO_4 + NaHCO_3.$$

Thus even in health acids formed within the body, or, taken in food, slowly acted as a drain on the alkali reserve of the blood which had constantly to be replenished. Calcium did not normally form an important element of this alkali reserve, although in acidosis a marked diminution of calcium took place in the blood serum, and if calcium salts were demanded for the mere vital purpose of overcoming acidosis they were no longer available for their primary purpose of hardening the skeleton and the teeth. There was clinical evidence in support of this. The demands of the body for alkali after the acidosis of acute fevers led to rapid tooth destruction often seen during and after convalescence.

There was a further point in the consideration of acidosis of special interest to dentists. Many dentists were obsessed by the idea that the large proportion of carbohydrate in the modern diet was largely responsible for the prevalence of caries. It must be remembered, however, that to cut down carbohydrates to a minimum was to tend to create acidosis. Mrs. May Mellanby, in her work upon vitamins, had shown that feeding on a diet deficient in vitamin A led to deterioration of the dental tissues, and Howe had produced caries in animals by similar means. McCarrison conclusively proved that food deficiencies had a definite action on the endocrine apparatus and hence arose the changes in the teeth.

Mr. Broderick's conclusions were as follows:—

1. So long as the enamel remains intact there can be no caries.
2. Enamel in health progressively hardens as life proceeds.
3. This hardening is due to a progressive laying down of lime salts, taken from the body store of ionic calcium.
4. This body store is, in health, equivalent to the need of the individual at the time, and is preserved by the endocrine apparatus, which is also the fixer of lime salts in the teeth.
5. If the endocrine apparatus is thrown out of balance in the direction of calcium starvation, this reserve store is diminished, and fixation of lime salts in the teeth is interfered with.
6. An upset in endocrine balance in childhood youth and pregnancy will be in the direction of calcium starvation.
7. Calcium starvation will lead to a diminished calcium index in the saliva, with a lessened alkalinity of that secretion, thus directly promoting caries.
8. Endocrine derangement, leading to a loss in balance towards calcium starvation, will tend to produce a condition of acidosis by lessening the alkali reserve of the body; in the compensation of this condition the calcium salts, together with other alkaline salts, will be utilised for acid neutralisation, and therefore not be available for the hypercalcifying the teeth.
9. If the acidosis be more severe, built-up and fixed inorganic lime will be torn away from bones and teeth to help build up this alkali reserve, and thus preserves life, lowering the resistance of the teeth to caries.
10. That without this susceptibility to caries, exciting causes such as food fermentation do not matter; but if immunity be removed hardly any reasonable care and attention are sufficient to preserve the teeth entire.
11. That endocrine derangement will account for all the conditions leading to dental caries, whether they be diet, lack of vitamins, or altered salivary secretion.

Mr. Broderick showed the skulls of three rabbits from the same litter. The first had been fed on a normal diet, while the diet of the second and third contained ovarian extract, and a mixture of extracts of thyroid, pituitary, and suprarenal glands respectively. It was noticed that the teeth of the rabbit fed on ovarian extract had thinner enamel than that of the one on normal diet, while the teeth of the rabbit fed on the mixture of gland extracts were larger, and the enamel was the more dense.

Discussion.

The PRESIDENT, in opening the discussion, suggested that much experimental work would be required to establish some of the introducer's deductions.

Prof. W. D. HALLIBURTON found much in the paper of a suggestive nature. It was now being widely realised that the health of the teeth did not depend entirely on the use of the tooth-brush. He felt that Mr. Broderick was right to attach much importance to our knowledge of calcium metabolism; but while a vast amount of work had been done on this subject, there was still very little certain knowledge of it. He thought, however, that just as when the functions of the heart and lungs were first discovered, every disease was ascribed to some derangement of these organs, so at the present time there was a tendency to explain everything by an upset of the endocrine organs.

Dr. LEONARD WILLIAMS thought people should ask themselves "What can we do to be saved from this deadly heritage of caries?" Dr. Harry Campbell had contended that if our children were fed as we feed our puppy dogs on material which compelled vigorous mastication, the natural development of the jaws would be ensured, and malposition and malnutrition of the teeth abolished with the consequent caries, pain, and pyorrhœa. Dr. Williams held that this was not quite sufficient. A vigorous calcium metabolism was also necessary, and for this normally acting endocrine glands were essential. And to ensure a good team of endocrine glands one had to begin with the child in utero. The mother must be fed on vitamins. Lime was necessary to the teeth and jaws; endocrines were necessary to the lime, and vitamins were necessary to the endocrines. When the child had erupted his teeth he must be taught to masticate vitaminous foods, so that not only would he develop his masseter muscles and mandible, but also he would have normally working endocrines. The pituitary gland was of especial interest to odontologists. The high-arched palate, and the undeveloped mandible, so often associated with adenoids, were a "function" of pituitary insufficiency. The child was usually bright and well developed, but the outside upper incisors were badly developed and the nails had no half-moons at their roots. Sometimes there was a vagary of pigmentation. For these undeveloped jaws dentists sometimes prescribed pituitary extract. He emphasised two points: the preparation of the whole gland should be prescribed in doses of 5–6 gr. three times daily; pituitary therapy was useless unless the child was fed on an intensive vitamin dietary.

Mr. J. A. WOODS (Liverpool) said that he had seen a patient suffering from osteomalacia, and her teeth were exceptionally good. He had noticed that during pregnancy there was no very marked increase in caries, except where there had been neglect beforehand. He thought Mr. Broderick had laid too much stress on the importance of the enamel.

Mr. J. G. TURNER said that Mr. Broderick appeared to try to establish two main points: (1) that diminished alkalinity of the saliva leads directly to dental caries; (2) that enamel after eruption of the tooth undergoes both increase and decrease of its lime salts. Dealing with the first point, Mr. Turner asked whether it was certain that saliva ever reached the sites of caries, which depended on the lodgement of sticky starchy and sugary food together with acid-forming germs. They were covered by mucus. Decay always began in the "stagnation areas," never on the well-rubbed areas, which showed that susceptibility to decay was particular to portions of each tooth, not general to the whole tooth. Thus saliva had practically no influence on dental caries. Other observers had failed to find increased susceptibility to caries in acute illness: the decay which became apparent during the 6–12 weeks of an illness began months before and was due to show itself at this time. Caries of the enamel was a slow process. Mr. Turner himself had estimated that the least time to perforate the enamel at the buccal gum edge (this was not the extreme edge of the enamel) was nine months, and at the abutment area two years. Such figures put out of court observations based upon the decay of illness or pregnancy. Mr. Turner said that it was difficult to prove that enamel underwent variation in its content of lime salts. If mucus was impervious to saliva this thesis fell to the ground at once. Clinically he did not know of such hardening. Hypoplasic enamel remained soft throughout life. He did not find that pyorrhœa and dental caries were mutually exclusive, they were commonly associated; so much so, that he called one form of dental caries "decay of pyorrhœa." Mr. Broderick quoted Dr. Kirk as saying that youth was the period of greatest susceptibility. In his (Mr. Turner's) experience there was a predisposition to decay throughout life. He attributed the relative immunity of adult life to the fact that fewer sweets were eaten, that there was some attempt at cleanliness, and that the removal of decayed teeth allowed drainage of the remainder.

Mr. J. HOWARD MUMMERY said that it was commonly taught that enamel was an inert or dead substance, as it did not appear to show any channels, yet the enamel of teeth was not absolutely impervious; it was susceptible to dyes. Many observers had shown extensive malformation in the enamel of the teeth even of apes. He himself had ground sections of teeth from a neolithic jaw, and even here there were numberless defects and fissures in the enamel.

Sir FRANK COLYER said that Mr. Turner had already anticipated him in many observations he had intended to make. As regards the decay of pregnancy, when it occurred, he believed it was due to nothing more than the soft starchy foods commonly eaten by pregnant women. The caries of infancy he called "biscuit decay." Children were sent to bed after a meal of biscuit and milk, which resolved itself into an infective "biscuit poultice" around their teeth. Dr. Williams had said that we should feed our children as we feed our puppies. But even puppies were incorrectly fed on "pappy" food, and developed pyorrhœa in consequence. He said, as regards the formation of the jaws, here as elsewhere the shape of the bone depended on the forces acting upon it, and if the jaw were insufficiently used, it would be poorly developed. If endocrine derangement were responsible for dental caries why should 66 per cent. of 500 London horses have carious teeth, and why should hutch-fed rabbits also suffer from caries while the same animals in a wild state were practically immune? His brother, Dr. Stanley Colyer, had observed marked differences in the incidence of caries amongst three native tribes living in South Africa, which could only be accounted for by the very slight difference in the diet, since the tribes were ethnologically related and living under otherwise similar conditions. The tribe which included sugar in its diet was chiefly afflicted with caries!

Mr. BRODERICK, in reply, said he had come to learn and not to teach.

GLASGOW OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY.

A MEETING of this Society was held on Nov. 16th in the Faculty Hall, Glasgow, when Dr. G. BALFOUR MARSHALL delivered his Presidential address on

Fibroids complicating Pregnancy, Labour, and Puerperium.

with illustrative cases. He said that since his undergraduate days great changes had come in the management of pregnancy, parturition, and the puerperium in cases complicated by uterine fibromyomata. Then it had been the teaching and the practice to induce abortion in many cases; with the development and comparative safety of laparotomy, Cæsarean section, and hysterectomy, the treatment was now revolutionised. Dr. Marshall pointed out that women suffering from fibroids were frequently sterile, and this was particularly true of the submucous and interstitial varieties of these growths. He quoted two cases in which women who had borne children subsequently became sterile owing to fibroids. Pregnancy could occur in cases of submucous and even polypoid fibroids, and although there was a tendency to abort, such pregnancies might proceed to term. Abortion and premature labour were sometimes due to fibroids, especially the submucous type. Dr. Marshall had met with abortion due to all varieties of fibroid, and three of which he described in detail. He described also the following case, illustrative of the production of premature labour by a sessile subserous fibroid.

Mrs. M., aged 25, one child. Complaint of abdominal pain and swelling. Examination revealed a seven months pregnancy complicated by a large subserous fibroid projecting from the anterior uterine wall at the level of the umbilicus. There was slight uterine hæmorrhage, and labour was just beginning. Patient delivered herself without difficulty,

the point of interest being that each uterine contraction made the fibroid harden and protrude, causing the patient extreme pain.

Dr. Marshall divided the cases into three classes: (A) Cases which might safely proceed to term. (B) Cases requiring operation, but suitable for myomectomy. (C) Cases requiring hystero-myomectomy. As to Class A it was doubtful if there was any justification for the induction of abortion, as so many apparently hopeless cases proceeded to term. Large fibroids which had almost occluded the pelvis occasionally rose with the growth of the uterus, aided no doubt later by the development of the lower uterine segment, and normal delivery followed. In the Class A cases the main complaints to be feared were pain and hæmorrhage. Rest, sedatives as indicated, and general treatment usually met these cases, which, if not improving, must be considered as included in Class B. The indications for myomectomy were torsion of a subserous fibroid with necrosis, prolapse, or impaction of a subserous fibroid in the pelvis, an anterior fibroid causing retroflexion likely to cause abortion or incarceration and excessive pain. The cases suitable for this line of treatment were of the subserous type. It was not advisable to remove an interstitial fibroid of any size during pregnancy, because of the attendant hæmorrhage, the weakening of the uterine wall, and the frequency of abortion following. In three cases he had performed this operation, two proceeding later to term, the third aborting on the third day. In Class C the fibroids were generally very extensive and patient had extreme pain. Rest and the usual methods did not ease her.

The majority of cases which went to term terminated spontaneously, but one had to be prepared to meet more than usually severe labour-pains, uterine inertia, and malpresentations, and in neglected cases rupture of uterus would follow. Dr. Marshall recalled one case in which a fibroid in the pouch of Douglas had to be pushed past the brim to permit delivery, and he felt that had this been impracticable a posterior colpotomy might have been done. The correct line of treatment was Cæsarean section, in cases of obstruction, provided the patient was otherwise in a state for this operation. In the case of a fibroid which might be removed later by myomectomy, it was best to perform that operation at a later date, but in the presence of extensive fibroids or possible infection Cæsarean hysterectomy was the ideal line of treatment. Under proper supervision craniotomy should never be required, and pulling a child past an obstructing fibroid with forceps was certainly to be condemned. Post-partum hæmorrhage, both primary and secondary, was apt to occur in a uterus the seat of submucous and subserous fibroids. The possibility of these complications should not be forgotten, and means to combat them should always be at hand and used promptly. A more serious danger was sepsis. Pressure or injury during parturition might lead to degeneration and subsequent sepsis, or the tumour might be injured during forceps delivery and later become infected. In conclusion, Dr. Marshall expressed his astonishment at the extraordinary shrinkage noted in uterine fibroids after a pregnancy.

Discussion.

Prof. J. M. MUNRO KERR congratulated Dr. Marshall on his interesting communication. In view of the great tolerance of uterus and patients to fibroids he almost felt inclined to look upon pregnancy, labour, and the puerperium as the complications. In the past year he had seen four cases in which hysterectomy had been contemplated, but two of these had been carried safely to full time, when the patients had living children by means of Cæsarean section. Fibroids were apt to degenerate during pregnancy owing to the altered metabolism, and Prof. Kerr advocated the practice of elimination with rest in all cases. In cases where only one tumour of several caused trouble, this could often be removed by myomectomy. This operation was a simple one in pregnancy; rupture of uterus rarely followed it, and cases were recorded in which operators had gone down as far as the decidua without disturbing the pregnancy.

Dr. W. D. MCFARLANE had seen many cases which had appeared hopeless go to term. He agreed that stimulation of the excretory organs was of great advantage. One case of interest was that of a patient who had a pregnant fibroid uterus impacted in the pelvis. Laparotomy was performed, the uterus lifted from the pelvis, and the woman proceeded to term and delivered herself normally. After delivery the tumour was so reduced in size as to be almost unappreciable.

Dr. J. LINDSAY spoke from his experience as a general practitioner, whose attitude was to give pregnancy the preference to fibroids. He had never seen abortion follow fibroids, and in cases where fibroids had been appreciated in early pregnancy he had not experienced any difficulty in delivery.

Dr. CRAIG had had examples of abortion and sterility resulting from fibroids. In one case he had found a small fibroid in the pouch of Douglas; at the second confinement difficulty was experienced, and at the third induction proved necessary. Growth continued and hysterectomy was ultimately required.

In reply Dr. MARSHALL expressed satisfaction at the importance laid on the medical treatment of fibroids. The pregnancy was the all-important thing, and effort must be directed towards its preservation. He felt disinclined to accept myomectomy with its attendant risks, and in cases where operation was unavoidable greatly preferred hysterectomy.

SHEFFIELD MEDICO-CHIRURGICAL SOCIETY.

A MEETING of this Society was held on Nov. 24th, Dr. GODFREY CARTER, the President, being in the chair, when Mr. W. W. KING opened a discussion on

The Treatment of Ante-partum Hæmorrhage.

From an analysis of various hospital reports, covering nearly 60,000 deliveries, he had estimated that the incidence of this complication of childbirth was 2·5 per cent. as opposed to the usual estimate of 0·2 per cent. Mr. King confined his remarks to that variety of ante-partum hæmorrhage which results from placenta prævia, and showed that on theoretical grounds hæmorrhage, shock, and sepsis should be the three great dangers which would threaten the life and health of the mother. Prematurity, hæmorrhage, and the direct results of treatment were the corresponding causes of fœtal death. In the 898 cases of placenta prævia analysed 7·6 per cent. of the mothers and 55·3 per cent. of the children lost their lives. The figures were identical with some published 20 years ago, and show that there has been no improvement in the results of treatment during these years. A study of the maternal mortality showed that 15·9 per cent. of the total deaths occurred in women who were admitted to hospital in so grave a condition that they died undelivered. Out of 58 patients who were delivered 15·7 per cent. died of hæmorrhage, 18·9 per cent. of septicæmia, and 51·7 per cent. of shock. Considering the nature of the disease it was surprising that hæmorrhage had caused so few of the deaths. This would appear to show that the methods in common use for the arrest of hæmorrhage were efficient at least in this respect. Most, if not all, of the deaths from septicæmia were the result of faulty technique and should therefore have been avoided. Tissue-trauma in the presence of hæmorrhage was the great cause of shock, and the need for the gentlest manipulation, and, above all, of avoiding rapid delivery, did not appear even yet to have been fully realised. More than half the total deaths were due to this cause, and, in the majority of cases, it was clear from the records that death had resulted from the too hasty extraction of the child. The other deaths were not of obstetrical importance, with the exception of one from rupture of the uterus. In

one other case this catastrophe was recorded, but the patient recovered. As to details of treatment, Mr. King advised palliative treatment in the interests of the premature child when the hæmorrhage was slight and the conditions suitable. With severe loss and the patient not in labour Cæsarean section was generally the best treatment. In cases in which the patient was in labour the Champetier de Ribes bag should be used in the interests of all living and viable children. Version should only be used for the dead and non-viable. Rupture of the membranes was only safe when the hæmorrhage was slight and the os at least half dilated. By adopting palliative treatment in suitable cases under proper conditions, by Cæsarean section and by the use of the Champetier de Ribes bag, it should be possible to reduce considerably the enormous fœtal mortality of placenta prævia. The maternal death-rate would be reduced by early treatment, careful asepsis, gentle manipulation, and slow delivery. Morphia and intravenous glucose were advocated in the prevention and treatment of shock. Strychnine was useless and pituitary extract dangerous.

Discussion.

The PRESIDENT said that his practice had always been to effect delivery as soon as possible, irrespective of the life of the child.—Mr. P. F. BARBER stated that in his experience version was the most satisfactory method of treatment. He asked what evidence there was that patients died of shock. He thought that hæmorrhage was the most common cause of death.—Prof. M. H. PHILLIPS, while agreeing upon the whole with the main propositions of the paper, thought that Cæsarean section should be more commonly performed for placenta prævia. He emphasised the danger of rapid delivery and of even slight post-partum hæmorrhage.—Mr. J. CHISHOLM related his conversion from rapid delivery to the saner method of slow extraction.

MANCHESTER MEDICAL SOCIETY.

A SPECIAL meeting of this Society was held on Nov. 23rd in conjunction with the members of the Liverpool Medical Institution in the Medical Society's Reading Room, University of Manchester. After the meeting the visitors were entertained to dinner by the members of the Manchester Medical Society. Dr. T. A. GOODFELLOW, President of the Manchester Medical Society, was in the chair.

Dr. R. J. M. BUCHANAN read a paper on

Points of Clinical Interest in the Diagnosis of Abdominal Diseases.

He emphasised the importance of definite pain as a sign of organic disease. He considered the terms "neuritic," "neurosis," and so forth in relation to abdominal disease as mostly wrong and certainly unsafe. So-called functional disease was the last to be sought for. Dr. Buchanan drew attention to abdominal pain caused by disease in the thorax—e.g., empyema, pulmonary syphilis, pericarditis, and spinal diseases—and to pleuritic effusion as an early herald of malignant disease in the abdomen. He thought that too little attention had been paid to careful auscultation of the abdomen, especially in localising peritonitis, and pointed out the value of light auscultation of the abdominal aorta for a bruit which he found present in pathological conditions in which the aorta is pressed upon, especially malignant disease. Dr. Buchanan suggested that this physical sign might be tested as occasion arose. He considered that delay in recuperation of the blood after hæmatemesis favoured a diagnosis of malignant disease. Profound anæmia often accompanied malignant disease of the cæcum. Dr. Buchanan emphasised the prevalence of venous thrombosis in malignant disease, and said that in any case of thrombosis the viscera should be examined. He spoke also of the exacerbation of symptoms with pyrexia noticeable in cases of leaking gastric and duodenal ulcer. Dr. Buchanan advocated that all cases in which X rays are used a complete "watch through" should be done. He pointed out the ease with which disease of the appendix could be revealed even to the demonstration of concretions, and illustrated this with lantern-slides. In such cases the cæcum was often distended, a Jackson's membrane present, and plication called for. Dr. Buchanan drew attention to the tender spots on the back in the region of the suprarenals in Addison's disease. His address was illustrated with water-colour drawings, radiographs, and lantern-slides.

Mr. G. P. NEWBOLT read a paper upon the

Diagnosis and Treatment of Carcinoma of the Large Intestine,

based upon 60 cases upon which he had operated. Of these 26 occurred in the sigmoid colon, 11 in the splenic flexure, 11 in the cæcum, 8 in the hepatic flexure, and 4 in the transverse colon. Out of 33 resections done up to 1917, 12 patients were alive at present. Sigmoid and splenic growths were, he thought, most favourable. He emphasised the importance of an early diagnosis in these cases if a successful result was to be obtained, pointing out the difficulty in diagnosis where the growth was small. Radiology had done a good deal in helping the exact location of some of these growths. He considered that a three-stage operation of cæcostomy, followed by excision of the growth with direct union, and later by a closure of the cæcostomy, was the ideal operation in the absence of obstruction. Paul's operation was the best in cases where obstruction was present. Cæcostomy should be done in patients who were very ill in consequence of acute obstruction. As 37 out of the 60 growths were situated in the sigmoid and splenic regions Mr. Newbolt advocated incision on that side in cases in which the situation of the growth had not been exactly diagnosed. Where obstruction existed he advocated exploration from the right side with the view of localising the growth, and then a cæcostomy, with free removal of the growth later when the intestines were empty. He suggested that the median incision was rarely necessary.

Dr. MURRAY BLIGH read a note on

Ketosis in Children,

in which he referred to the lack of practical assistance in the diagnosis of the condition and in the estimation of its degree. He considered there was urgent need of means to measure precisely the extent of acidosis in children. He referred to the practice of limiting the amount of food or of actually starving children immediately before operation and to the tendency of the anæsthetic, whether ether or chloroform, to convert a relatively mild ketosis into a severe intoxication. The custom of postponing operations because the tested urine showed the presence of acetone, the saturation of the child with bicarbonate of soda, and the infliction of a second period of starvation was based on unsound knowledge. The qualitative test for acetone indicated nothing more than that acetone, diacetic acid, and oxybutyric were present in the blood and were being eliminated in the urine. The presence of acetone in the urine of children was misleading as evidence of depletion of alkali reserve in the blood. It suggested the possibility of dangers which did not exist, and it led to uncontrolled treatment with alkalies. Dr. Bligh recalled the experiments of Prof. Haldane and his co-workers in which the eating of large quantities of alkali led to a state of alkalosis as evidenced by diuresis, increased alveolar CO_2, and diminution in the ammonia in the urine, but the appearance also of acid bodies in the urine. Acidosis occurred without acetonuria and also occasionally along with acetonuria when there was no relationship between the two conditions. The causes of acidosis were multiple. Physiologically it was a diminution below certain limits in the alkalinity of blood plasma. Clinically such a condition might result from bacterial infection, from fermentation and its resultant lactic acid production; from internal

asphyxia with accumulation of CO_2 in the tissues as the result of impeded circulation, from imperfect fat-metabolism, from elimination by the kidneys of alkali in excess, from any renal defect which inhibits the elimination of acid sodium phosphate. The physiological changes brought about had been made the basis of methods for the diagnosis of acidosis and the estimation of its degree, but none of them were quite satisfactory. The estimation of CO_2 tension in the alveolar air of infants and young children was not an easy procedure. The apparatus required expert manipulation and was difficult to use in routine work in private and in hospital. True acidosis was associated with but not always due to the presence of acetone bodies, and the most common cause of it from the clinical point of view seemed to be the excess of sodium phosphate in the blood. It was the function of the kidney to excrete this substance, and it did so normally in considerable quantity. Failure in this excretion resulted in retention and consequently diminished alkalinity. In most infantile diseases there was an associated pyrexia and urinary secretion was diminished sometimes to the point of anuria. Renal function was often inactive even without the existence of true renal disease. Impaired renal function was of high importance as a factor in the production of acidosis; it was frequently associated with ketosis, but the latter was usually of lesser importance.

Reviews and Notices of Books.

DICTIONARY OF PRACTICAL MEDICINE.

Edited by Sir MALCOLM MORRIS, K.C.V.O., FREDERICK LANGMEAD, M.D., F.R.C.P., and GORDON M. HOLMES, C.M.G., C.B., M.D. Dub., F.R.C.P. In three volumes, containing in all 1796 pages. London: Cassell and Co., Ltd. 1921. £5 5*s*. complete.

THIS dictionary ranges over the whole gamut of medicine, surgery (with the exception of fractures, dislocations, and major operations), midwifery (not including labour), gynæcology, dermatology, clinical pathology and bacteriology, forensic medicine, public health, and anæsthetics—and the important task is accomplished in a work of three volumes. With such an ambitious scope it is clear that all subjects cannot be dealt with fully, and that the dictionary must not be compared with a series of standard text-books dealing with the individual subjects. To justify its existence it must, therefore, present in a handy form the essentials of knowledge contained in the text-books and journals, together with the personal views of the contributors.

As regards medicine, we can but postulate a hypothetical practitioner who seeks help when confronted with a patient showing slightly unusual symptoms, and try to estimate what help he would receive. One faced with an atypical cretin could not fail to find illumination from the illustrated note on cretinism, while the brief reminder of the symptoms of diverticulitis might well serve to clinch the diagnosis in an obscure case. The article on disseminated sclerosis is up to date, including modern conceptions of its ætiology, and in a disease whose early manifestations may be so varied the section on symptomatology should be of great use. In seeking information on less well-defined conditions the practitioner may be less well served. If consulted by a patient who has expectorated a fibrinous cast from his bronchi, he will find no reference to this somewhat obscure but important condition under the heading "bronchial" or "cast." From "fibrinous bronchitis" he will be directed by a cross reference to "bronchitis"; in the article on this subject the only relevant allusion is that in cases of diphtheritic infection of the bronchi a fibrinous membrane may be formed in the large tubes, but this, of course, has nothing to do with true fibrinous bronchitis which may occur in acute or chronic varieties. Again, the practitioner may seek information on modern views of asthma, on the diagnosis of difficult cases by their sensibility to various cutaneous protein tests, and on treatment by means of desensitisation by antigens. These methods are sufficiently well recognised to merit mention in any modern account of asthma, but receive none here; moreover, asthma is regarded by some at least as a toxic idiopathy, not necessarily due to reflex vagal stimulation.

Medico-legal work often presents far more difficulty to the busy practitioner than does any problem in diagnosis or treatment. He may well feel at a loss how to proceed when suddenly called in to give evidence in a doubtful case of infanticide or of injury; these subjects are admirably dealt with, and the article on medical evidence should be of considerable help in the preparation of data for the court. Under the heading of malpraxis the reader will find a pregnant and topical warning as to the dangers to which he is liable from an action for damages brought by a dissatisfied patient. As to surgical subjects, but little space is wasted on descriptions of difficult operations which can only be performed by the specialist. Advice is clearly given that a case in certain stated circumstances should or should not be operated upon, and this alone is what the practitioner requires to know. A few special points are well brought out. The importance of complete nephrectomy in cases of tuberculosis localised to one kidney is emphasised. Although such a line of treatment is well recognised by specialists, it is still only too often believed by practitioners, and even by consulting physicians, that palliative treatment is satisfactory; thus valuable time is often lost and the disease may be allowed to progress until the second kidney is affected. An unusual but very helpful section is that dealing with enlargement of lymphatic glands; in one short article the diagnosis is clearly and carefully considered. Intestinal obstruction is a subject deserving of rather wider consideration. It is curious to note that although operation is advised in some cases of hyperpituitarism, no such form of treatment is even suggested where there is a deficiency in the function of this gland. Fröhlich's syndrome and cases of the Loraine type are often due to cysts which may be cured by operative treatment.

On the whole the articles dealing with obstetric and gynæcological affections are disappointing, though the accounts of pruritus vulvæ, puerperal insanity, radium therapy, and syphilis deserve mention as being specially illuminating. The omission of any consideration of labour leaves a noticeable gap which cannot but affect the completeness of the accounts of conditions of pregnancy and the puerperium. In the discussion of puerperal eclampsia insufficient stress is laid upon the modern methods used by the Rotunda school, and perhaps too much stress upon veratrum, a drug not much used in this country. The warning against operative interference and the undue performance of Cæsarean section in this condition is a wise one. The old-fashioned distinction between sapræmia and septicæmia is still maintained under the heading puerperal septicæmia. This distinction is quite out of date, since the former is now recognised to be a mild grade of the latter. Under the heading of sterility we are told that prostitutes are sterile because of sexual exhaustion; this is probably not so, since the woman is generally quite a passive agent and the sterility in most cases is due to pelvic disease. The description of the pathology of subinvolution of the uterus is somewhat defective. The account of fibroids of the uterus is ill-balanced, too much stress being laid upon red degeneration, and the operation of myomectomy, recommended for certain cases, is not as a matter of fact much practised. The prognosis given of the probable results of operative treatment of carcinoma of the uterus is unduly optimistic. Most gynæcologists at present get but poor results, and the modern

tendency to combine radium or X rays with operation is the outcome of dissatisfaction with present methods. Three subjects typical of those about which the practitioner often seeks in vain for information are infant feeding, examination for life insurance, and the preparation for, and the after-treatment of, operations. All of these are admirably presented.

Our selection for special praise or blame of certain individual sections of a well-planned work must not be allowed to give the impression that the volumes lack balance. The proportion of space and importance allotted to each subject is well maintained. There are numerous plates and figures illustrating the text, and some of the coloured plates are excellent. The contributors to the work are numerous and distinguished, and though all the articles may not reach the same high standard, most of them are complete, concise, and up to date, and the dictionary thus deserves a place in the library of every practitioner.

SEXUOLOGY.

Sexual Life of Primitive People. By H. FEHLINGER. Translated by S. HERBERT, M.D., and Mrs. HERBERT. London: A. and C. Black. 1921. Pp. 133. 6*s*.

Sex: For Parents and Teachers. By W. L. STOWELL, M.D. New York: The Macmillan Company. 1921. Pp. 204. 17*s*.

As is now acknowledged, the practice of politics has a good deal to learn from science, especially perhaps from medical science. Nowhere, surely, is there a more obvious lesson than the sexuological one, both at home and abroad. That peoples groaning under the evils of venereal disease and prostitution should seek to impose, more or less forcibly, their own practice in sexual matters upon other peoples practically free from the said evils, is an anomaly that will divert at any rate the Muse of History. Dr. Herbert has done good work in translating—capably enough—this well-documented but succinct account of the sex life of savages. We see again the peculiar character of ethnology—namely, the difficulty in making generalisations. "It is a mistake," says Fehlinger, "to assume hastily that customs among primitive people that appear strange to us must therefore be ancient and be relics of a primitive state. Every primitive race has a long history behind it, and it is not likely that it has remained static all the time." However, with physical characteristics we are on surer ground than with social culture; and in the author's account of the very late appearance of sexual secondary characters in a Melanesian tribe it may be permissible to see evidence of an approximation on their part to the primitive bisexuality. This is an exact and scientific work, which may be recommended as a source of information.

Dr. Stowell's is one of the countless popular expositions and recommendations of sexual enlightenment. It differs from them in general by being illustrated. Several of the plates are unnecessary—e.g., of a sow suckling a litter, especially as the animal is not, as stated, a Berkshire, but of the variety known as Large White. The work is orderly in arrangement, but poor and somewhat naïve in style. Parents and teachers may, however, find much helpful matter here, and their charges may in after years have cause to thank them for consulting the worthy and chatty pages of this book.

THE ORGANS OF INTERNAL SECRETION.

Their Diseases and Therapeutic Application. Third edition. By IVO GEIKIE COBB, M.D., M.R.C.S. London: Baillière, Tindall and Cox. 1921. Pp. 352. 10*s*. 6*d*.

Dr. Cobb's book on the organs of internal secretion was originally published in 1916, and a third edition is evidence of a favourable reception.

In the present volume two chapters have been added, one dealing with the inter-relationship of the ductless glands and the nervous system, and another in which some practical points on hormone-therapy are discussed. The book is intended for the general practitioner, and in this it fulfils its purpose very well, for Dr. Cobb avoids as far as possible the discussion of unproved theories, preferring to confine himself to such things as he has himself tested in practice or have been approved by men of large authority on the subject. The literature of endocrinology is now becoming voluminous, and too many authorities are being led by their enthusiasm into making exaggerated claims for their special methods of gland therapy. Dr. Cobb avoids these exaggerations; and is properly cautious in his presentation of the opinions of others where these have not been sufficiently corroborated. The book presents the main facts of our knowledge of the ductless glands in such a form as will prove of great value to the general practitioner.

Dr. Cobb devotes fully a quarter of his book to the thyroid gland and its disorders. His treatment of this subject is on the whole adequate, but his list of the minor thyroidal deficiencies might be extended. Both the suprarenal and pituitary glands receive somewhat less attention than they deserve; the physiological action of adrenalin on the circulation might with advantage be discussed in greater detail and the importance of minute doses in asthma pointed out. Dr. Cobb gives a very minor place to anterior pituitary, for he considers the action of the pituitary gland depends almost entirely on the active principle of the posterior lobe. This will not be admitted by all endocrinologists, for extracts of the anterior lobe have an extensive therapeutic application, both in the disorders of the young and in the degenerative changes of old age. More might be made also of the use of corpus luteum in treatment. These, however, are minor criticisms, and are not intended to detract from the value of the book, which admirably serves the purposes for which it is intended.

GYNÆCOLOGY.

By BROOKE M. ANSPACH, M.D., Associate in Gynæcology, University of Pennsylvania. With an introduction by JOHN G. CLARK. London and Philadelphia: J. B. Lippincott Company. With 562 illustrations. Pp. 752. 42*s*.

IN Dr. Clark's introduction this text-book is described as one of a type in which the author selects his literary references with great care and, combining these with the observation gathered from his mature experience, constructs a well-balanced text-book. It would seem that this is not undue praise, and the author is to be congratulated on the production of a well-written and comprehensive work. Considerable stress is laid upon the important facts in embryology, anatomy, and physiology, which should be known to the student when he begins the study of the diseases of women, and the chapter on embryology is well and copiously illustrated. A section dealing with developmental anomalies follows naturally, and then a good account of the anatomy and physiology of the pelvic organs. The chapters dealing with physical examination are well arranged, and the details of the investigation of the urinary tract are given more fully than is usual in a work of this kind. Particular diseases of the various parts of the genital tract are next dealt with in detail. In the chapter on diseases of the endometrium and myometrium there are some good illustrations of sections of the uterine wall treated with Weigert's stain. The chapter dealing with the hygiene of adolescence, and the relation of neuroses to pelvic diseases is especially illuminating; and an important one from the point of view of everyday practice is that on backache, for the author describes very clearly the part played by status in the production of backache in women. Perhaps more space is devoted to the diseases of the urinary tract and of the anus and rectum than is usual in English text-books of gynæcology, but, after all, a knowledge of these affections is essential to the gynæcologist

even if he does not undertake their treatment. In discussing various special conditions, the author has not hesitated to call in the aid of specialists with the result that there are authoritative chapters dealing with such subjects as tuberculosis, cutaneous lesions of the external genitalia, acidosis, X ray therapy, and radium treatment. The book is well illustrated, there is a good index, and a well-selected bibliography. Altogether the author is to be congratulated on the sound and clearly written text-book which should prove most useful to practitioners and students.

Menstruation and its Disorders. By EMIL NOVAK, A.B., M.D., F.A.C.S., Instructor in Clinical Gynæcology, Johns Hopkins University. London and New York: D. Appleton and Co. With 40 illustrations. 1921. Pp. 357. £1 1*s*.

As the author states in his preface, a great deal of new knowledge on the important subject of menstruation has been accumulated during the past 10 to 15 years, and our conception of the nature of this process has undergone a considerable change. This book is a most excellent monograph and contains a full account of all we know at the present time on this subject. In considering the relation between œstrus in the lower animals and menstruation in women the work of Heape is quoted with approval and his views are adopted. A good and well-illustrated account is given of the changes which occur in the mucous membrane of the uterus during menstruation. A full note is furnished upon Schroeder's description of the process, divided into the three stages of desquamation, proliferative and secretion, is given, and it is pointed out that if his work is confirmed it is a step forward in our knowledge of the relationship of ovulation and menstruation. Schroeder believes that, as a rule, ovulation takes place about the fifteenth day of the cycle, at the end of the proliferative stage, and further supports the old view that there is a complete loss of the superficial or functional layer of the endometrium followed by regeneration from the basal glands. The interesting question of the formation of the corpus luteum is fully discussed and illustrated. Dr. Novak inclines to the belief that the cells are of epithelial origin, but as he points out there is need for the study of larger numbers of early corpora lutea.

The old and the new views with regard to the causation of menstruation are passed in review, and the evidence in favour of the modern belief that the essential cause is the internal secretion of the ovary is well discussed. No doubt most readers would think that the non-coagulability of the menstrual blood was capable of a ready explanation, but that this is not so is evident from the fact that Dr. Novak is able to do no more than sum up the findings of those who have tried to explain this phenomenon. To show the thoroughness with which the author deals with the whole subject, we may mention that besides a good chapter on the clinical manifestations of menstruation, there are sections dealing with puberty, the hygiene of puberty, precocious menstruation, and non-menstrual genital hæmorrhages in the new-born; these are followed by three chapters dealing with the menopause and an interesting study of the relation of menstruation to ovulation. From the histological evidence, which seems the most trustworthy, there appears to be a definite relation between the two, and ovulation would seem to occur most commonly between the fifth and fourteenth day of the cycle. Amenorrhœa, dysmenorrhœa, and intermenstrual pain are fully considered, and there is also a useful chapter on hæmorrhage from the uterus, special importance being given to the functional variety. A very useful and practical chapter is the one dealing with the part played by the endocrine glands in association with the menses and the organotherapy of menstrual disorders. The final chapter on treatment by radium and X rays is contributed by Prof. Howard Kelly and Dr. C. F. Burnham. There is a full and complete index.

A good monograph, full of sound information and with excellent bibliographies.

LIFE AND TIMES OF AMBROISE PARÉ.

With a new translation of his Apology and an Account of his Journeys in Divers Places. By FRANCIS R. PACKARD, M.D. New York: Paul B. Hoeber. 1921. Pp. 297. $7.50.

GRANTED that it was worth while to write another book about Paré after Mr. Stephen Paget's work, to which Dr. Packard refers with praise, the book now before us is compiled as well as possible except for one or two slips. The illustrations are many and good, there are two maps of old Paris, and an admirable index is included. Thomas Johnson's translation of the Apology and the Journals is known to most men who study medical history, but the style is too archaic for some people. We note that both on the frontispiece and in the table of illustrations Johnson's name is mispelled as Johnston, an error which should be corrected. Another slip occurs in a footnote on p. 153, "The Low Bretons speak a Celtic patois very dissimilar to French as spoken in Paris." Breton is not a patois but a distinct language, akin to Welsh and still more to the now extinct Cornish language. The Apology was written in answer to the attack made on Paré's use of the ligature in amputations, by Etienne Gourmelen. It was a crushing answer, and in addition remarkable for the way in which Paré insists on the necessity for practical knowledge in surgery as apart from that obtained from books. Altogether Dr. Packard's book is good reading.

BIOLOGICAL CHEMISTRY.

By H. E. ROAF, M.D., D.Sc., M.R.C.S., L.R.C.P., Professor of Physiology at London Hospital Medical College, University of London. London: Methuen and Co., Ltd. 1921. With 47 diagrams. Pp. 216. 10*s*. 6*d*.

THE diagram of biological processes, which forms the frontispiece of this interesting book, shows the extreme points of the range of biological chemistry. The various intermediate stages are described succinctly in the text under Sections II. and III., entitled Anabolism and Catabolism. Section I., Chemical and Physical, is an outline of the organic and physical chemistry needed for an understanding of the subject. The abstract facts of these subjects are very difficult to make clear and there is no short cut to their thorough understanding. Though considerable space is devoted to this section, it is not really adequate to explain the elements of chemistry; the reader is expected to have some knowledge, and of this he will be reminded by study of this section.

The section on anabolism deals first with photosynthesis and contains a short account of F. F. Blackman's researches on the conditions affecting this change, such as intensity of illumination and quality of light, temperature and concentration of the substrate, carbon dioxide, and the mechanism of light absorption by the chlorophyll. Here is also given a brief account of the chemistry of chlorophyll and other pigments and their possible functions. Carbon dioxide is transformed through formaldehyde to carbohydrate; this occurs probably by reduction through formic acid, but only the suggestion that the first stage is carbon monoxide and hydrogen is here mentioned. Polymerisation of formaldehyde to a hexose is evidently the next stage, though cane sugar or starch is the end-product. Hexose appears to break down to lactic acid through pyruvic aldehyde; pyruvic acid may yield acetaldehyde from which fat may be formed by aldol condensation, as suggested by Raper. Fat synthesis may equally well take place by the union of acetaldehyde and pyruvic acid according to Smedley, though the stages are more complicated. The synthesis of amino-acids for building up proteins

may again be through ketonic acids like pyruvic, which can be converted into alanine with ammonia. The difficulty of ascertaining the intermediate stages and the methods of determining them are pointed out.

The section on catabolism contains a description of the process of digestion in animals—absorption, nutrition, respiration, excretion, and the chemical regulation by the secretions of the ductless glands. Each chapter is short, yet the essentials are well and carefully explained. The author's aim was to write a readable account of the chemical processes in living organisms. He has succeeded in doing so. The book can be thoroughly recommended to readers wanting an introduction to biochemistry, while the numerous references to larger books and to original papers will be valued by those who have been stimulated to desire more information.

Practical Biological Chemistry. By G. BERTRAND and P. THOMAS. Translated from the third edition by H. A. COLWELL. London: G. Bell and Sons. Pp. 348. 10*s.* 6*d.*

MM. G. Bertrand and P. Thomas's "Guide pour les Manipulations de Chimie Biologique" is a work well known and much appreciated in France, and Mr. Colwell has performed a good service to our technical literature by undertaking the somewhat laborious task of translation. The work is broad and practical in character and will be read with interest by students of biochemistry. It is not intended as a laboratory handbook for the specialist in pathological biochemistry or any other particular branch of the subject, but is designed to afford a suitable scheme of work covering a wide field, so as to ensure a broad foundation for any investigations the student may afterwards concentrate upon. The first portion of the work is concerned with the detection and estimation of the elements, such as copper in snails' blood, boron in wine, &c. The sugars, polysaccharides, glucosides, fatty and aromatic acids, fats, alkaloids, proteins and their hydrolysis, pigments, and so forth, follow, with appropriate methods of isolation, detection, and estimation. The second portion is concerned with enzyme chemistry and is evidently the work of Prof. Bertrand, who is a master of this subject. Hydrolases, oxidases, clastases, elements of microbiology, fermentations and the identification and estimation of the chief products of fermentation, and various synthetic phenomena are dealt with in a clear and concise fashion. A few errors occur—for instance, a wrong value is given to the specific rotatory power of maltose, and the value of the book would be much enhanced if references were given in the text.

EARLY SCIENCE IN OXFORD.

Part I., Chemistry. By R. T. GUNTHER. Oxford University Press: Humphrey Milford. 1921. Pp. 91. 10*s.* 6*d.*

PREVIOUS to the publication of the book now before us Mr. Gunther had already conferred an obligation on students of the history of science in Oxford by the issue of his Daubeny Laboratory Register, which, among other information, gave a list of scientific treatises by members of Magdalen College up to and after the erection of the Daubeny Laboratory. The earliest treatise mentioned is one by Edward Wotton, 1552, being a zoological work entitled "De Differentiis Animalium," a part of which—namely, that dealing with insects—was published by Dr. Thomas Moufet, under the title of "The Theatre of Insects, in 1634," and again edited and published together with Topsel's "History of Four-footed Beasts," by J. R., M.D., in 1658.

The present volume is the first of a series intended to deal with the history of science in Oxford in general. Part II. is to treat of mathematics, and Part III. with astronomy, and further parts are to follow supposing that financial difficulties in regard to the cost of production are overcome. If the following portions of the work are as good as that now before us Mr. Gunther may be warmly congratulated, for he has given us a most interesting account of chemistry at Oxford from the time of Roger Bacon down to the nineteenth century.

The first persons, it may be assumed, to sell what may be broadly called "chemicals" in this country were the apothecaries, and although Freind says that Johannes Falcandus of Lucca, 1357, was the first apothecary in England, Mr. Gunther points out that Wood mentions one John the Spicer who held a seld—i.e., shop—in *ypotecaria*, in the parish of All Saints in Oxford in 1332. (We can add an even earlier mention of apothecaries than this, for the Ward Robe Rolls mention one Odin the Spicer who was Apothecarius Reginæ in 1313.) After Bacon experimental science languished until the early years of the seventeenth century, but circa 1640 Oxford became the centre of scientific study in England. The protagonist was the Hon. Robert Boyle, who was the first to prepare hydrogen, and who also was the first to introduce into Oxford a regular teacher of practical chemistry—namely, Peter Sthael, "a great hater of women and a very useful man." In this century, too—i.e., in 1671—John Dwight of Christ Church took out a patent for the process of salt-glazing stoneware, and about the same time Sir Kenelm Digby and John Mayow were experimenting on the use of "the Sal-Nitro" in agriculture. Mayow was Fellow of All Souls, a great chemist, and was the practical discoverer of oxygen as put forward in his Tractatus de Respiratione. Besides the Oxford laboratories there were many in London and the suburbs, one of which was kept by Nicolas Le Fevre or Lefebure circa 1664, when Professor of Chemistry to Charles II. He wrote a work called "A Compleat Body of Chemistry," in which, amongst other receipts, he gave directions for preparing "mummy" quite equal to that prepared from "bodies dried up in the hot sands of Lybia."

To return to Oxford, the first university laboratory was founded by Elias Ashmole in 1683, and, like most other seventeenth century laboratories, was placed in a cellar to minimise danger from fire; it may be said of early chemists that, like the early Christians, they wandered in dens and caves of the earth. The eighteenth century study of chemistry in Oxford is marked by the foundation of the Worcester Porcelaine Company by Dr. John Wall, of Worcester and Merton Colleges, and by the lectures of Dr. Martin Wall, who remarked in his first lecture that "Chemistry has improved Science .... given occasion to the invention of gunpowder, and a coup de grâce to the miseries of war," a statement which reads oddly in the light of recent events. We need only add that Mr. Gunther's book ends with a full account of Dr. Daubeny, his laboratory, and the apparatus contained therein, a worthy finish to an excellent compilation.

GENERAL MEDICINE.

Vol. I. of the Practical Medicine Series. Edited by FRANK BILLINGS, M.S., M.D., Head of the Medical Department and Dean of the Faculty of Rush Medical College, Chicago; and BURRELL O. RAULSTON, A.B., M.D., Assistant Attending Physician and Resident Pathologist, Presbyterian Hospital, Chicago. Chicago: The Year Book Publishers. 1921. Pp. 630. $·250.

THIS volume is the first of a series of eight, to be issued at monthly intervals, and covering the entire field of Medicine and Surgery. It is intended to summarise the work of the previous year in a handy form for the general practitioner, and is therefore somewhat similar in aim to the *Medical Annual*. This volume deals with the infectious diseases, respiratory diseases, diseases of the heart and blood vessels, endocrinology, metabolic disorders, diseases of the urinary and gastro-intestinal tracts, affections of the liver and pancreas, and deficiency diseases. It consists of a series of abstracts from papers published in the American, British, and Continental medical journals, about 70 per cent. of these being culled from the American press. There are 38 plates,

and the whole forms an attractive volume. The series is undoubtedly of value as a means of rapid reference to recent publications, and the practitioner is enabled to purchase separately the volumes dealing with subjects of especial interest to him.

LECTURES ON THE SURGERY OF THE STOMACH AND DUODENUM.

By JAMES SHERREN, C.B.E., F.R.C.S., Surgeon to the London Hospital; Member of the Council and Court of Examiners, Royal College of Surgeons of England; Examiner in Surgery, University of London. London: H. K. Lewis and Co., Ltd. 1921. Pp. 99. 4*s.* 6*d.*

IN this book Mr. Sherren has published a series of lectures given by him to the students of the London Hospital. The diseases dealt with are gastric and duodenal ulcers, stenosis of the pylorus, and carcinoma of the stomach. The ætiology, symptomatology, and treatment of the simple ulcer is discussed fully. Around the subject of the chronic ulcer there has raged a controversy which cannot yet be said to have died down. Without entering into the merits of conflicting theories or methods, Mr. Sherren gives us his own views and methods of investigation and treatment, built upon a large experience. The book is a plea for more accurate clinical observation, for whereas test-meals and X rays may be of assistance, they are often misleading. The clue to a correct diagnosis lies in a review of the clinical aspects of the case, and the clue to success in treatment is in an early and exact diagnosis. In this book will be found much valuable help for those who have to deal with these difficult conditions.

OPERATIVE DENTAL SURGERY.

By J. B. PARFITT, L.R.C.P., M.R.C.S., L.D.S., Dental Surgeon and Lecturer on Operative Dental Surgery at the Dental School of Guy's Hospital. London: Edward Arnold and Co. 1921. With 108 illustrations. Pp. 319. 21*s.*

Dr. Parfitt interprets his title in a somewhat limited sense, for he omits those proceedings of the dental surgeon which may be classed as minor surgical operations; for instance, the extraction of teeth is discussed only as regards the mechanical principles and not from the purely surgical aspect, and the reader will therefore find no detailed account of how best to remove teeth and no helpful suggestions for negotiating difficult teeth, such as the misplaced lower third molar. Perhaps in future editions the author may see his way to include an account of this side of operative dentistry, and so add to the value of what is undoubtedly a very useful work.

This book deals mainly with the methods of filling and crowning teeth, but there are also useful chapters on scaling, ionic medication, and the management of children, written in a concise yet clear way, so that we gain the impression that we are receiving the results of experience gained in practice and teaching. During recent years much attention has been drawn to the question of pulpless teeth, and many ailments have been attributed to the presence of such teeth in the mouth. The reader naturally turns with interest to see what are the author's views upon this subject. He deals with it in a broad-minded way; he shows the difficulties that are encountered in filling root canals, and points out that the safety and usefulness of such teeth depend entirely on the presence or absence of infection. He shows clearly, too, that it is impossible to remove all the pulp tissue from many teeth, but considers that if such tissue as is left is kept sterile during the operation on the pulp the patient's own natural or acquired immunity is very likely able to keep it permanently sterile. As regards septic teeth, he is of the opinion that such can be rendered sterile, and for this purpose he advocates the use of tricresol with 10 per cent. of paraform.

This book should be extremely useful to anyone engaged in the practice of dental surgery.

JOURNALS.

IN the JOURNAL OF THE R.A.M.C. for November Dr. H. M. Woodcock gives the first part of an article on hæmatophagy, a function of the large mononuclears, by which they absorb other blood elements when outworn. They digest these elements, and then portions of their pseudopodia become abstricted, and so blood platelets are formed. The article is well illustrated.—Major N. V. Lothian continues his historical investigation of the soldier's load, telling us that the Earl of Leicester (ca. 1560), whose armour is in the Tower, rode over 25 stone, which accounts for the heavy type of the knight's horses. He again remarks on the large number of non-combatant attendants who accompanied the heavily armed soldiers, as was evidenced at Bannockburn, when their charge over the "Gillies' Hill" appeared as the advance of a new army, and decided the fate of that historic day.—Captain W. D. Beamish believes he prevented an epidemic of influenza at Kasauli by volatilising iodine over a small spirit lamp in the barrack-rooms, and avoided having to close a school at Sanawar by similarly treating the class-rooms. The cost was half a rupee a day. His reports are certainly interesting.—Major J. E. H. Gatt observed an outbreak of mumps in a group of 400 Mahomedans, while 400 Hindus alongside entirely escaped, because the Mahomedans feed themselves with their hands out of a common dish, while the Hindus cook and eat, each by himself.—Lieut.-Colonel Langford Lloyd pleads for a peep-sight, one-tenth of an inch in diameter, as backsight for the service rifle, and decentred glasses for rifle shooting.—Major E. H. Myles finds that castor oil applied externally is the best treatment for vaccinia, and Sir L. Gubbins, formerly Director-General, wishes physical training to be continued throughout the soldier's service, and notes what fine men for the service the London carmen are, in part as the result of their continually working in the open air.

Reports and Analytical Records.

BIOLOGICALS: TESTS AND REMEDIES.

(BURROUGHS WELLCOME AND CO., SNOW HILL BLDGS., E.C. 1.)

Diphtheria Toxin for Schick Reaction.—This firm is now issuing phials of the diluted toxin ready for use in the Schick reaction. This test is performed by injecting intracutaneously in the arm 0·2 c.cm. diphtheria toxin diluted in saline to approximately 1 c.cm., an amount representing 1/50 minimum lethal dose for a guinea-pig. A phial for control test containing an equivalent amount of heated toxin is supplied. The test is based upon the fact that man normally possesses sufficient diphtheria antitoxin in his blood to neutralise this small amount of toxin injected. In such event a negative result is obtained and the patient is said to be immune. In some cases, however, this small amount of natural antitoxin is absent and the injected toxin gives a pink flushed area in the skin from half to one inch or more in diameter with a smaller deep red centre. This positive reaction signifies lack of immunity. The control test made with heated toxin in the other arm should, of course, show no reaction. Many thousands of diphtheria contacts examined in this way show that it is possible to separate immune from non-immune persons. An annotation on this test with references to recent literature appeared in THE LANCET, 1921, i., 1317. A previous test toxin issued was put up with 0·5 per cent. phenol and could not safely be kept for more than a fortnight.

Diphtheria Toxin-Antitoxin Mixture for Active Immunisation.—We have also received from the same firm samples of their diphtheria prophylactic toxin-antitoxin mixture. This mixture is stated to contain in 1 c.cm. a small amount of diphtheria toxin to which has been added just sufficient antitoxin to neutralise

it. Three injections of 1 c.cm. given at weekly intervals, subcutaneously, are considered sufficient to produce immunity. The method was described in our columns by A. T. Glenny, K. Allen, and R. A. O'Brien (THE LANCET, 1921, i., 1236).

Sachs-Georgi Reaction for Syphilis.—The sample of Sachs-Georgi antigen submitted is considered to give, when diluted, a denser suspension than the original antigen. This suspension of a cholesterinised extract of heart tissue is put up in the usual 1 c.cm. phials ready for diluting 1 in 10 for immediate use.

Mixed Gland Preparation.—Tabloid brand preparations of endocrine glands have also been received from the same firm. These are designed for oral administration. No. 1 tabloid is obtained from endocrine glands of the male and No. 2 from the female. In the former six gland extracts are used, and in the latter seven.

BENZYL BENZOATE CAPSULES.

(PARKE, DAVIS, AND CO., 50–54, BEAK-STREET, W. 1.)

We have received samples of benzyl benzoate put up in gelatin capsules, each containing 5 minims of the ester with an equal volume of olive oil. The contents of the capsules are clear and homogeneous. Benzyl benzoate occurs naturally in Peruvian balsam and in balsam of tolu; it may be prepared chemically by the interaction of benzyl alcohol and benzoyl chloride, or of benzaldehyde and sodium benzylate. The capsules have been prepared for use as antispasmodics in the treatment of conditions in which there is supposed to be undue rigidity or spasm of unstriped muscular tissue. Good results have followed its administration in persistent hiccough (THE LANCET, 1920, ii., 512), whooping-cough (ibid., p. 615), and asthma (ibid., pp. 808 and 920); and it has also been recommended in such various affections as excessive intestinal peristalsis, cardiospasm, pylorospasm, biliary, ureteral, and renal colic, and spasmodic dysmenorrhœa. The dose is 1 to 3 capsules, three or four times daily.

"LUKMAH" TONIC TEA.

(ELLIS DAVIES AND CO., 16, MINCING-LANE, LONDON, E.C. 3.)

This tea, which is sold in a finely broken condition at 1*s.* 10*d.* the half-pound packet, is stated to be blended with "a neutralising agent of tannin." On analysis the tannin content of the tea was found to be 13·7 per cent. and the ash 5·64 per cent. Both these figures may be regarded as typical of a tea of good quality. An infusion of the tea showed no smaller amount of tannin than is customary in normal tea. We do not think that it is wise to apply the term "tonic" to tea unless there has been addition of a drug having specific medicinal properties.

CINZANO BRUT.

(CINZANO, LTD., 43, DOVER-STREET, LONDON, W. 1.)

This is a natural sparkling wine, the product of Italy, of agreeable flavour and of a champagne character. The relatively high alcohol content and low sugar show it to be fully fermented. The composition on analysis was:—

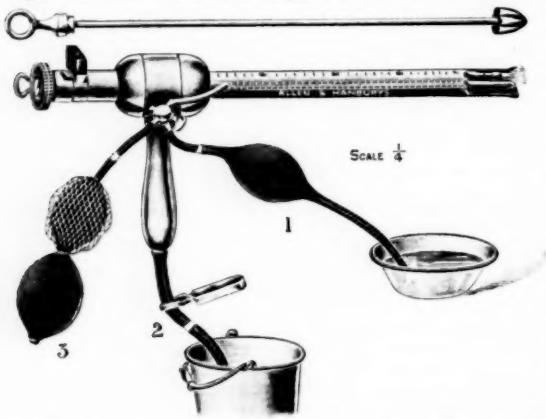
	Per cent.
Alcohol	13·55 (by volume).
Equivalent to	23·8 proof spirit.
Total extractives	2·69
Containing mineral matters	0·14
,, sugar (as invert sugar)	1·35
,, cane sugar	nil.
Total acidity as tartaric acid	0·7
Volatile acid as acetic acid	0·03

Preservatives, including sulphites and salicylic acid, were tested for and found to be absent.

New Inventions.

AN IRRIGATING SIGMOIDOSCOPE.

THIS instrument is an ordinary sigmoidoscope, modified to avoid the difficulties met with in examining a rectum which has been imperfectly cleared. The figure shows the essential points in its construction.



A short way beyond the eye-piece the calibre of the tube is increased to form a definite chamber, in which any remains of an enema or fluid fæces will collect without running down on to the eye-piece. From this chamber fluid can escape through the handle, which is hollow and is attached to a wide rubber tube closed when not in use by a clip (2). At the side of the chamber there is a three-way tap connected with the ordinary bellows (3) and a Higginson's syringe (1). By means of the tap either the bellows or the Higginson's syringe can be put into communication with a narrow tube which passes along the inner wall of the instrument, terminating just inside its open end. By this means it is possible to inflate the bowel in the usual way or to project a stream of water over the bowel wall. When the operator finds that there is an escape of fluid from the bowel he removes the clip from the tube attached to the handle, turns the tap so as to connect the Higginson's syringe with the narrow inner tube, and washes the bowel clean. When this is accomplished the tap is turned in the opposite direction, inflation resumed, and the examination completed. The only other point to be noted is the shape of the obturator, which is grooved at the sides to allow for the inner tube. I have used the instrument a large number of times, and although it may appear rather complicated it is quite simple to use.

Messrs. Allen and Hanburys, of Wigmore-street, London, W., have carried out my design.

ARTHUR EDMUNDS, C.B., M.S. Lond.,
Queen Anne-street, W. F.R.C.S. Eng.

A NEW PENILE CLAMP.

THE illustration shows a penile clamp that I think will be found useful in those cases where medicaments are required to be retained in the urethra for some time, and also for the "sealing in" abortive treatment of gonorrhœa. In the latter case the clamp is loosely adjusted before the injection of the 20 to 30 minims of collosol argentum, and is firmly closed after injection. The meatal seal of collodium can now be applied at leisure, and the clamp should not be removed until after the seal has hardened. The clamp will be found to be satisfactory for use with any adolescent or adult male patient. Owing to such great variations in size of the penis with different individuals the usual spring clamp is often useless. The "sealing in" abortive treatment of gonorrhœa is very valuable in suitable early cases, and any method tending to the simplification of the technique is of interest.

The instrument has been made from my design by the Holborn Surgical Instrument Company.

Harley-street, W. H. WANSEY BAYLY.

THE LANCET.

LONDON: SATURDAY, DECEMBER 10, 1921.

Old and New Methods of Diphtheria Prevention.

THE report on diphtheria, made to the Ministry of Health by Dr. S. MONCKTON COPEMAN, published last week, should give an impetus to the greater use in this country both of the Schick reaction as a means of determining susceptibility to the disease, and of toxin-antitoxin mixture as a means of conferring active immunity on those who are found to be susceptible. From the time of SCHICK's first publication in 1913 onwards the nature of this simple test has been frequently described in medical literature, and the character of positive and "pseudo" reactions obtained to it have been illustrated. The extensive use made of this test, and of active immunisation methods, in certain American cities, especially New York, is also common knowledge. When all due reservations are made, it seems certain that once the technique of this little test has been mastered, and experience has been gained in judging the reactions, (especially if a control test with heated toxin solution is performed at the same time on the opposite arm,) the distinction of the positive response presents little difficulty, when it can be asserted with considerable confidence that on exposure to infection diphtheria will only occur among the positive reactors.

This separation of susceptibles in itself is a valuable aid to preventive measures in times of epidemic diphtheria. It is still more valuable as an index to those members of the community at risk, who should be advised to receive active immunising treatment by toxin-antitoxin mixture, in the anticipation that they will obtain an effective immunity which is likely to last for several years. In this country, partly because other means of dealing with the spread of diphtheria are so well established, and partly through the absence of any supply of the necessary materials by public health authorities, the Schick and associated methods have been very little used in practice. Dr. COPEMAN's presentment of the facts is derived mainly from PARK, ZINGHER, and others who have secured the adoption of these methods on a most extensive scale in the schools of New York, as well as among the general population of that city. In Great Britain the Schick test has been applied, though only on an experimental scale, at a few infectious diseases hospitals, notably those in Edinburgh and Manchester. Dr. COPEMAN's own experience has been limited to trials of the method on a small scale, first in an institution in Bristol, and later at the Mitcham Schools of the Holborn Union. The results of these trials, which he made with the assistance of several distinguished fellow-workers, and with standardised toxin-antitoxin mixtures prepared by Dr. R. A. O'BRIEN of the Wellcome Laboratories, appears to have been generally satisfactory. In the Mitcham schools, all of 329 children, ranging in age from 3 to 14 years, were submitted to the Schick test, and 98 afforded a positive reaction. All the reactors were immunised by means of at least three separate inoculations of toxin-antitoxin at intervals of four to seven days in doses of 0·05 c.cm., 0·25 c.cm., and 1 c.cm. In three only was the reaction following the inoculation even of sufficient severity to require a day's stay in bed. Of eight adults inoculated with similar doses, none were off duty at any time, although one suffered from malaise and soreness of the arm for a couple of days. According to the view expressed in this report, the evidence of the effectiveness of the Schick method combined with active immunisation is now sufficient to make its adoption desirable in special cases. A chief instance is that of nurses and others who come into close contact with diphtheria infection. Another is the systematic use of the method in residential schools and similar limited communities. Further than this, there is the not infrequent case of parents who are specially anxious to avoid all possible risk of diphtheria infection for their children, and who are anxious and ready to accept any prophylactic method which can be recommended to them with confidence. A more difficult question is raised when it is asked whether the general application of this measure of prevention, as adopted in New York, should be recommended for English communities. The obstacles which would have to be met, before wholesale testing and inoculation could be undertaken at our elementary schools, and among the population generally, are obvious and somewhat formidable. In a note, addressed to Sir GEORGE NEWMAN and forming a preface to Dr. COPEMAN's report, Dr. G. S. BUCHANAN expresses the opinion that it would be premature to advise such a system of general immunisation in this country. Before this could be done, it would be necessary not only to have further and longer experience of the New York results, but also to consider whether equally good results cannot be achieved by the customary measures of diphtheria prevention which we adopt, and more particularly by improved methods based on the same principles. It is clear that in some respects our traditional means of dealing with diphtheria prevalence need to be revised.

The principal directions in which revision is necessary will be found in Dr. BUCHANAN'S observations, given elsewhere in our present issue, which raise practical considerations of considerable importance. Measures of prevention in regard to diphtheria carriers ought, in view of present knowledge, to be restricted, if it can be shown to be possible, to those carriers whose diphtheria bacilli are demonstrated to be virulent. The practicability of applying this principle depends largely on the development of laboratory methods recently proposed, by which the virulence of a number of separate cultures can be tested simultaneously on the same experimental animal. The restriction of preventive measures to virulent cases would, of course, permit a very desirable economy in time and in money when dealing with diphtheria outbreaks. Another important economical consideration is raised in the portion of the report which insists that there is no good legal or practical ground for notifying the "bacteriological" carrier, otherwise healthy, as a case of diphtheria, or for removing such a carrier to an isolation hospital—often to the exclusion of cases requiring treatment. The warning given against waiting for bacteriological confirmation before giving antitoxin in cases already clinically recognised as diphtheria deserves special attention, as also do the limitations of routine swabbing at schools and hospitals. It is evident that methods of prevention based on the detection of infective cases and carriers should not be discarded in favour of the new systems of prophylaxis until further efforts have been made to improve on them in the light of newer knowledge of the carrier condition and of virulence tests. This can only be done by careful collection and study of the experience, past and future, of public

health officers, medical officers of isolation hospitals and schools, with the closest possible association of the bacteriological laboratory in their investigations. It is satisfactory to note that the Ministry of Health are continuing to obtain the facts from all these sources, as well as from special research being conducted by the Medical Research Council, in the hope that before long it will be possible to obtain scientific authority for a code for the prevention of the spread of diphtheria as definite as that which we now possess in the cases of enteric fever and small-pox.

The Therapeutic Possibilities of B-Vitamin.

THE absence of B-vitamin from food has hitherto been associated mainly with those severe symptoms collectively grouped together as beri-beri: hence this vitamin is often referred to as the anti-neuritic factor. But though these manifestations are the final result of the long-continued consumption of food entirely lacking, or containing a little but not enough of, this vitamin, the earlier signs appear to be of even greater importance. MCCARRISON, who has studied this aspect of the disease with such care in animals and man, considers that the earlier symptoms are referable to the digestive and endocrine systems, and only the later ones to the nervous system. In the early stages he has recorded loss of appetite, indigestion, flatulence, abdominal pain due to gaseous distension of the hollow viscera, headache, giddiness, weakness, coldness, breathlessness; and at a later stage chronic constipation, colitis, appendicitis, intussusception, stasis, and gastro-duodenal ulcers. Post-mortem examination showed atrophy of thymus, pancreas, spleen, and all endocrine organs except the adrenals, which were enlarged. CRAMER, DREW, and MOTTRAM record in our present issue (p. 1202) that rats fed on a diet deficient in B-vitamin showed a shrinkage of thymus and spleen, almost complete disappearance of Peyer's patches and lymphoid tissue in general, and a diminution of small lymphocytes in the blood. A state of marasmus is associated with this atrophy of lymphoid tissue and is apparently the specific effect of the absence of B-vitamin. In concluding from their observations that B-vitamin is not necessary for the life of each individual cell, and that its presence is necessary solely for the normal functioning of lymphoid tissue, the authors enter upon more debatable ground. If the effect of absence of B-vitamin were limited to the atrophy of lymphoid tissue and production of marasmus, such a conclusion might be justifiable, but their theory will scarcely account for the complexity of symptoms in beri-beri. The article by Dr. SAMSON WRIGHT, on p. 1208, draws attention to the loss of appetite of animals fed on a diet deficient in B-vitamin, the quantity eaten being dependent on the apparent quantity of B-factor in the food.

Of the three vitamins, the B-factor seems most closely connected with metabolism, growth, and health. Several workers have observed a connexion between food assimilation and the amount of B-vitamin in the food, and it is surprising that while each of the three vitamins have long been used as specifics for certain diseases, the general therapeutic and tonic possibilities of B-vitamin have not been further explored. This subject offers an almost virgin field to the general practitioner anxious to do some useful clinical research, and we commend to his attention the therapeutic considerations advanced by Drs. CRAMER, DREW, and MOTTRAM as well as the suggestions of Dr. SAMSON WRIGHT. Carbohydrate and fat metabolism seem dependent upon a proportionate amount of B-factor per calorie ingested. This connexion suggests the administration of B-vitamin in cases of diabetes to assist the utilisation of sugar. The addition of cod-liver oil or butter (fats rich in A-vitamin) to a diet deficient in B-vitamin has been shown to cause loss of weight and ill-health, while an increase in amount of B-vitamin led to assimilation of the fat with renewed health and growth. Cases of marasmus in infants, which had failed to put on weight by the usual treatment, began to grow directly they were given extra B-vitamin. As long ago as 1917 A. F. HESS [1] found that although yeast, which is rich in B-vitamin, apparently possessed little or no value as an antiscorbutic, it proved an excellent stimulant of growth in infants; he showed graphs of infants of under 1 year, 1½, and 2 years old who had maintained an almost constant weight for weeks or months in spite of various changes in diet, and showed an immediate and continuous rise after the administration of autolysed yeast. In some cases the appetite was stimulated, but in others there was a prompt response though the total food intake was not increased. That the yeast had a favourable effect on the digestive processes was shown not only by the increase in appetite, but by the improved character of the stools.

The chief source of B-vitamin in our food is the seeds of cereals and other plants, but the factor is removed from cereal seeds in the process of milling. Sugar, sago, and other farinaceous products are lacking in B-factor, meat and fish are poor, offal and eggs in comparison rich. Vegetables and milk contain small amounts. The quantity in these foodstuffs is scarcely sufficient to balance the large carbohydrate consumption of white flour in our diet, unless eggs, fruits, and vegetables are eaten in great quantities. The products richest in B-vitamin are the germ of cereals and yeast. Germ as such is not consumed by humans (except in wholemeal bread) and the yeast used in baking bread is not sufficient. Yeast contains B-vitamin in great concentration, and palatable preparations made therefrom can compensate for the lack of B-vitamin in other foods. No ill-effects have been ascribed to too great a consumption of foods rich in B-vitamin, and it is likely that certain cases of vague ill-health would be improved by the consumption of additional quantities of B-vitamin. There is here a promising field for clinical research.

The Teaching of Practical Midwifery.

AT the recent meeting of the General Medical Council the Report of the Examination Committee on the latest series of inspections of the qualifying examinations furnished material for an important debate, and will have given rise to much reflection in the Council as well as outside. The inspectors for medicine and for surgery reported that the examinations held by 23 of the bodies empowered to grant legal qualifications were satisfactory, but the inspector for midwifery and gynæcology, Sir WILLIAM SMYLY, had no such tale to tell. There is no part of the practitioner's work so anxious and so responsible as his work as obstetrician, and in no department of his duties are skill and watchfulness so repaid in the saving of life, in the prevention of sickness and deformity, and—a very practical addition—in the earning of unstinted

[1] American Journal of Diseases of Children, 1917, xiii., 98.

gratitude. It is a serious reproach to our national medicine that we are unable to provide adequate instruction in midwifery for our students; we should not in such a connexion be using the word adequate at all, for we ought to be able to show that the best facilities for teaching so important a subject are forthcoming.

Sir WILLIAM SMYLY divided his verdict upon the examinations in midwifery into four headings and reported as follows: The examinations of the Universities of Bristol, Birmingham, Durham, Manchester, St. Andrews, Glasgow, Belfast, and Dublin, of the Apothecaries' Hall of Dublin, and of the Irish Conjoint Board were "sufficient." These ten were personally inspected. He was unable to be present at the clinical examinations in Leeds and Edinburgh, but accepted the evidence of the examiners as to the methods followed and declared the examinations "sufficient." But of the examinations of the Apothecaries' Society, the London Conjoint Board, the Universities of Liverpool, Oxford, and Sheffield, the Scottish Conjoint Board, the University of Aberdeen, and the National University of Ireland, he said "in the absence of a clinical examination I cannot consider this examination sufficient"; while of the examination of London University he said "this examination is not sufficient." The examination at Cambridge was not reported on. The exact meaning which Sir WILLIAM SMYLY attached to the word "sufficient" seems to have been uncertain, but the Examination Committee of the General Medical Council have taken a lenient view in holding that their inspector meant to warn rather than to condemn those bodies whose tests he did not find "sufficient"; it is serious enough that practically half of all the bodies inspected should require warning on so vital a matter in the training of the practitioner. It might be expected that Sir WILLIAM SMYLY, one of our wisest and most experienced obstetricians, would hold strong views on the necessity of raising the level of examinations in midwifery and gynæcology, especially on the practical side, and the Examination Committee took him to imply that, apart from the question of the clinical tests, he was not dissatisfied with the level of efficiency actually required by any of the licensing bodies, save perhaps the University of London; and he was understood not to suggest that any of the candidates who had passed the examinations of the bodies in question should have been rejected.

With regard to the University of London, that body has already taken steps to remedy conditions which were capable of being immediately improved. Additional examiners have been appointed and the well-known rule that no student should be examined by one examiner only will be more carefully insisted upon. Further, every candidate will be for the future required to furnish certificates of instruction in clinical midwifery and gynæcology. The University will have to submit to reinspection at an early date, and no doubt the authorities find the position a vexatious one, but those who know where the real fault lies will find it difficult to allot blame. The teaching of practical midwifery is exceedingly difficult in the absence of a proper number of beds for lying-in women, and there is acute need for a larger number of beds of this sort in London. Putting the public side of the matter away from our minds, the London medical student suffers by comparison both with Ireland and with Scotland in receiving very little clinical instruction in this subject, though in all others he is particularly fortunate. That domestic midwifery has enormous value no one doubts, but it ought to be accompanied and illuminated by careful demonstration in specially equipped institutions. At a recent discussion of the Obstetrical Section of the Royal Society of Medicine concerning the teaching of obstetrics to medical students, the fact emerged that the number of beds available for lying-in cases in London hospitals attached to medical schools was only 97 of a total of 5250 in the 12 hospitals, and of these 69 only were available for teaching of medical students. Since that time some improvement has taken place, and a sensible number of lying-in beds have been added to the humiliating total, but many more are required. And until they are forthcoming the teaching bodies concerned may be submitted to reproach which they cannot avoid.

The Production of Chemical Drugs.

MUCH of the recent legislation in this as in other countries bears the stamp of the war; and governments have not yet broken free from a habit acquired in times when haste in the framing of measures of protection was a factor of prime importance. The hour of extremity is as productive of good resolutions as is a New Year's eve, and it is a common experience that these resolutions fade with the morning. But a short while ago we had made up our minds that the German and his goods were to be kept at arm's length for more than one generation; yet at this very time, before the wreckage of war has been cleared away, civil, if not polite, intercourse has been established, while great German cargoes are being unloaded at our ports. In some cases the goods are welcomed here because labour conditions in Germany and the disproportionate rate of exchange enable us to obtain them at lower prices than those at which they can be produced here; in other cases we are glad to have the goods because it is difficult, if not almost impossible, to procure them elsewhere. When the war began it was at once realised that we had allowed ourselves to become so completely dependent upon Germany for our supplies of certain kinds of manufactured articles that our stores, when exhausted, could only be replenished with difficulty. As a matter of fact this position offered problems which proved insoluble with anything approaching to complete satisfaction. The main thing was to produce the wherewithal to beat the enemy, and with this supreme task to accomplish there was little opportunity to become proficient in the manufacture of things not essential to the main purpose.

Among the chief articles which had to be used sparingly because their main supply was cut off were certain ranges of chemical drugs, analytical reagents, and laboratory glassware, and the resolve was made that never again would we be caught so soundly sleeping when so much required doing. Endeavours were made to produce here what we could not obtain elsewhere, and some of the wanted articles were produced in due course and on a commercial scale. Protection was promised for these infant industries, but when the time came for these promises to be fulfilled the public had already lost some of its enthusiasm, and the question of cost, which was a trivial matter when we were spending seven millions sterling a day, had again become an important factor in our calculations. Accordingly the Government passed the Safeguarding of Industries Act. If the volume of criticism of this measure has any foundation, it would have been in the interests of commerce had the Government failed to keep its pledge; but for better or for worse the Safeguarding of Industries Act is in operation, and the question that concerns the medical profession is whether the British chemical

industry, not to mention other trades whose products so intimately concern the medical profession, will be able, as a result of the protection afforded, to produce here articles which at present are mainly imported. We hope sincerely they will, but it must be admitted that the circumstances at the moment do not favour them. The Act is to remain in force for five years only, and as Germany has had forty years' start, the period of protection is brief. Again, between the introduction of the Bill and the enforcement of the Act several months elapsed during which importers had the opportunity, which they did not fail to employ, to bring into this country, free of duty, large supplies of those articles which are now subject to a tax of 33⅓ per cent. So considerable were the imports of some of the products that there is said to be a sufficient stock of them to satisfy the country's requirements for a very long time, and thus, in effect, a part of the five years' period of protection is lopped off and the industries concerned are discouraged from the start. The next question is whether the duty will be sufficiently high to serve its purpose, and to this no general answer can be given at any rate in respect of chemicals. The protected list of chemicals contains something like five thousand articles, and possibly more than a third of these are not at present made in this country; a large proportion of the latter are rarely used either in medicine or the arts or commerce, and it is estimated that so far as this proportion is concerned it is extremely unlikely that it would be worth the while of any manufacturer to undertake their production here. Further, it is alleged to be physically impossible to produce here several of the protected articles, so that by taxing the importation of such articles as santonin and menthol no British industry can ever be safeguarded. Incidentally, however, a referee is now hearing a complaint against the inclusion of santonin in the list, and as it is understood that the duty on menthol is to be modified, for the moment comment on the inclusion of these two articles must be in abeyance.

The Act provides that "synthetic organic chemicals, . . . analytical reagents, all other fine chemicals (except sulphate of quinine of vegetable origin), and chemicals manufactured by fermentation processes" are to be subject to an import duty of 33⅓ per cent. The Board set up under the Act has not the power to exclude from the list any article which falls in these categories. In compiling the list the Board has given to the term "fine chemicals," a wide interpretation that is now being challenged. Should it be established that the Board's view is correct, the only remedy open to the complainants will be an amendment to the Act, and we believe that already an amending Act is suggested which, without taking away any safeguard from British manufacturers, will secure an unhampered supply of desired products which are not likely to be produced here economically within the space of five years. So far the operation of the Act has not affected values in a general or substantial way. This is due to three causes: the large quantities of articles brought in before the duty was imposed, the bad state of trade resulting in keen competition among dealers for orders, and the low exchange value of the mark. As time goes on stocks on which no duty was paid will become depleted, and prices may then advance to the full extent of the amount of the duty, unless the Act has the desired effect and enables our manufacturers to compete with foreign producers; for trade must in time improve, and holders of stocks will become firmer in their views, and finally the exchange value of the mark will not be such an important factor, since the German manufacturers are now compelled officially to quote in sterling. Taking a broad view of the situation, while the principle of the Act, namely, the protection of essential industries, may be sound, we think it would have been in the interests of all concerned—the producer, the dealer, the prescriber, the chemist, and the ultimate consumer—had Parliament set up, under the Act, advisory committees representative of all interests, for the purpose of laying down the articles which should be protected. In the event of an amending Bill being framed we suggest that this principle should be adopted.

Annotations.

"Ne quid nimis."

OPIUM AND THE LEAGUE OF NATIONS.

PROGRESS has been made with the putting into force of the Opium Convention by the League of Nations since we last referred to the subject.[1] Both the Assembly and the Council of the League have had before them the report of the Advisory Committee appointed by the Council on the recommendation of the first Assembly, which met in December, 1920. This report of the Advisory Committee which held its first meeting in May of 1921, and which will meet again in the early part of next year, was considered and reported upon by Commissions both of the Assembly in September last and by the Council in October. It appears that the Council of the League on June 28th last approved of request being made to all Governments, whether members of the League of Nations or not, to ratify the Convention as soon as possible. They further resolved that Governments party to the Convention should prevent the export of the drugs named in the Convention (opium, morphine, heroin, cocaine, &c.) to other countries unless the Government of such importing countries approved thereof and certified that the drugs would be used for legitimate purposes. They also resolved to direct the attention of contracting Powers having treaties with China to the need for prevention of contraband trade in opium and other dangerous drugs. Moreover, as we intimated in September, the Council in June last took a step in advance of the Advisory Committee's report and resolved:—

That in view of the world-wide interest in the attitude of the League towards the opium question, and of the general desire to reduce and restrict the cultivation and production of opium to strictly medicinal and scientific purposes, the Advisory Committee on Traffic in Opium be requested to consider and report, at its next meeting, on the possibility of instituting an inquiry to determine approximately the average requirements of raw and prepared opium, specified in Chapters I. and II. of the Convention, for medicinal and scientific purposes in different countries.

The second Assembly of the League of Nations, recently held in Geneva, on the report of its Commission No. V., adopted, in the main, the resolutions of the Council of June, though with a few rather important amendments as well as with some additions. Lastly, the Council, on Oct. 17th, adopted a report containing the Assembly's resolutions as amended and added to. Perhaps the most important amendment made was that of the Council's own resolution of June 28th, quoted verbatim above, in reference to restriction of the production of opium. The limitation to "strictly medicinal and scientific purposes" was struck out and "legitimate purposes" substituted therefor. This modification of the Council's previous resolution was, as explained to the Assembly, "to meet the very special conditions obtaining in various countries, particularly in India, where opium is largely employed as a prophylactic or an effective remedy" without medical advice or prescription. The most

[1] THE LANCET, Sept. 3rd, p. 518.

important additional resolution was directed to investigation as to the inclusion of "all dangerous drugs of whatever origin, which produce similar effects" to those named in the Convention of 1912, and to the desirability of convoking another International Conference to draw up a yet wider Convention.

The Governments of Germany and of the Serb-Croat-Slovene State have also been invited to nominate representatives on the Advisory Committee. Inasmuch as, by the terms of the Convention, medicinal opium and all preparations, both non-officinal and officinal, containing more than 0·2 per cent. of morphine are to be confined to medical and legitimate purposes, we do not see how this can be effected unless in all producing countries, whether Turkey, India, Persia, or China, the area under poppy cultivation and the actual amount of production of raw opium are brought under strict supervision and control.

SCHOOLS OF PUBLIC HEALTH IN THE UNITED STATES.

IN recent years there have been important extensions in the teaching of hygiene and public health in American universities. For many years the School of Technology at Cambridge, Boston, which is closely affiliated with Harvard University, has led the way in the training of men for public health work. The late Prof. W. T. Sedgwick was the leader in this movement, and many of the most distinguished public health workers in the States owe their inspiration to his teaching and example. With his work Prof. G. C. Whipple was closely associated, and Dr. C.-E. E. A. Winslow, professor of hygiene in Yale University, is one of the most distinguished alumni of this school. These three and many others trained in the same school were non-medical graduates; and although a few of the non-medical graduates from the school have become the heads of State Boards of Health, most of them have become sanitary engineers and advisers on water and sewage and allied problems, and have not been engaged in public health administration as it is understood in England. The question as to whether there is a large need of public health experts of the highest grade who do not start as medical graduates is not under discussion at the moment; but it is noteworthy that in the States, as the country has become more fully settled, official public health posts are being generally occupied by medical men, though many of them, unfortunately, are destitute of training for their special work. At Harvard and Yale Universities excellent courses of instruction in public health work are given, and, as in a number of other universities, there are elaborate courses of instruction for social workers, and for nurses and public health nurses. But until the School of Hygiene and Public Health was opened at Johns Hopkins University, under the distinguished directorship of Dr. W. H. Welch, it cannot be said that the needs of those medical men wishing to be trained for a public health career were adequately met. The courses at this new school contemplate certificates after one and degrees after two years' work, and include a very thorough practical training in the foundation subjects of public health, physiological hygiene, chemistry, dietetics, zoology and protozoology, bacteriology, &c., as well as training in epidemiology and vital statistics and in applied public health. The endowment of the school is derived from the Rockefeller Foundation, and is adequate in amount to ensure that professors and associate professors each has ample opportunity for that combination of research and teaching which keeps teaching alive and prevents it from becoming mechanical and stereotyped.

The Johns Hopkins school has been successfully launched; and now we learn that the same beneficent foundation has endowed a similar school at Harvard University with the munificent initial gift of one and three-quarter million dollars. That the new school will justify its existence, and will have an important influence on public health developments in America may be safely prophesied. Its success, like that of its predecessor at Baltimore, will become more rapid so soon as one or more States can be induced to make it a condition of holding their public health appointments that candidates shall possess a satisfactory diploma or degree in public health.

EPIDERMOID CYSTS.

Dr. Henry H. Sherk[1] of Pasadena, California, who gives a brief résumé of 15 cases, on 11 of which he operated himself, remarks that epidermoid cysts are of fairly frequent occurrence, but are almost invariably unrecognised, being generally mistaken for sebaceous cysts. They have been variously termed atheromata, inclusion cysts, implantation cysts, and epidermoids (Franke). Only the elements of the epidermis are found in the wall and contents of these cysts. Some are undoubtedly traumatic in origin, and others are with equal certainty congenital. Those of traumatic origin grow more slowly and are of smaller size than the congenital, as embryonal cells have a greater ability to grow. Writers differ as to the most common site of these tumours. In the present series the cysts were found in the following situations: scalp, 4; back, 2; shoulder, arm, cheek, lower jaw, neck, breast, groin, buttock, and finger, 1 each. In two cases there were multiple cysts, the remainder were single. Seven were in men and eight in women. The cysts always appeared as more or less hemispherical nodules, projecting from the body surface, a few unattached to, but the majority fixed to the skin and freely moveable on the subjacent tissue. The overlying skin, with few exceptions, was firmly attached to the cyst. Epidermoids are not flattened like sebaceous cysts, nor, like them, can they be moulded or changed in shape. They are also differentiated from sebaceous cysts by the absence of an opening or duct by which their contents can be expressed. The pearly lustre and laminated appearance of the contents constitute their most noticeable characteristic, the final diagnosis being made by histological examination, which shows only the elements of the epidermis.

HYDATID FREMITUS.

THE description and explanation of hydatid fremitus or thrill given in the text-books is somewhat contradictory. Some writers say that it is pathognomonic of hydatid cyst; others, that it may be elicited in other forms of cyst. Prof. L. E. Barnett has contributed to the *New Zealand Medical Journal* for October a valuable paper which does much to clear up the confusion on the subject. He finds that two forms of vibration can be elicited on percussing fluid tumours. The first is an ordinary fluid wave vibration which is not peculiar to hydatid cysts, but occurs as a rare manifestation in certain thin-walled cysts in close contact with the abdominal wall. It may be felt in a very large hydronephrosis, parovarian and mesenteric cysts, a hugely distended bladder, ascites, and a unilocular hydatid cyst. This form of fluid vibration will be familiar to clinicians. The distinctive feature of the true hydatid thrill was first clearly described by Briançon in 1828. It is the exquisite spring-like vibration which is distinctly prolonged beyond the moment of percussion, and which is associated with the remarkable drum-like resonance heard on auscultatory percussion. Hydatid fremitus of this character alone is pathognomonic of hydatid cysts. It is of extreme rarity. Prof. Barnett has been quite sure of its presence only in seven cases, although he endeavoured to elicit it in over 300 cases of hydatid cyst. In every case in which it was demonstrated the following physical conditions were present: 1. The mother cyst was close under the parietes. 2. Its walls showed signs of degeneration, leading to a slackening of the high tension that normally exists in hydatid cysts. 3. Some large daughter cysts were present, not closely

[1] Surgery, Gynecology, and Obstetrics, November, 1921.

packed but having room to vibrate in contact with the walls of the parent cyst. The signs given when other physical conditions are present may be summarised as follows: single tense cyst—no thrill; single slack cyst—a wavy fluctuation but no thrill; cyst with daughter cysts tightly packed—no thrill. Prof. Barnett tried to verify these observations experimentally, using an imitation mother cyst made from the inner tube of a motor tyre and daughter cyst made from finger-stalls distended with water, but, like previous experimenters, not with unqualified success. It is here exceedingly difficult to reproduce artificially the exact conditions met with in nature.

THE HERITAGE SCHOOL AT CHAILEY.

THE present financial position of the Heritage Schools of Arts and Crafts for Crippled Boys and Girls at Chailey, in Sussex, is a cause of anxiety to those who are responsible for the work there carried on. An appeal for funds is issued by Princess Louise, Duchess of Argyll, Chief Patroness of the Schools, supported by the Bishop of London (President) and Sir Robert Jones (Chairman of the Surgical Board); the increased cost of upkeep of all kinds—repairs to buildings, wages of staff, food, &c.—has rendered necessary an augmented income for this most well-deserving institution. Founded in 1903, the schools have harboured 860 children up to the present time; of these the boys have been trained in woodwork of all kinds, particularly toy and cabinet making, and the girls in needlework and children's dressmaking. At the completion of their courses, equipped with a means of earning their own livelihood, they are placed with well-known firms. During the war 590 shell-shocked children were cared for, and a hospital was opened which housed in all some 600 wounded soldiers. The recent gift, by Sir Jesse and Lady Boot, of an operating theatre has greatly increased the means of dealing with paralysis, rickets, and congenital deformities. Sir Robert Jones speaks of the institution as having enormous possibilities of development, given sufficient financial support—making mention of electric light and an improved water-supply as immediately desirable. It is to be hoped that, even in these days of reduced subscriptions, the season of the year will not be without its effect upon the balance-sheet at Chailey.

THE INFLUENZA BACILLUS IN CULTURE.

THE recent epidemic of influenza stimulated a number of researches into the biological properties of *B. influenzæ*. Important new facts have been added, chief amongst which may be mentioned the demonstration of a soluble toxin, serologically differing races, and the production of indole. In addition, much light has been thrown on the substances required for the growth of the bacillus. This of necessity opened up the old controversy as to whether the bacillus was capable of growing in pure or impure cultures in the absence of blood. At the present moment the majority of workers seem agreed that *B. influenzæ* in pure culture cannot be grown in the absence of blood or some derivative of it. With regard to the behaviour of impure cultures there is some difference of opinion. Catani,[1] and more recently Thjotta,[4] as well as Williams and Povitzky,[6] claim to have obtained growths of *B. influenzæ* in mixed cultures in the absence of blood pigment. On the other hand, contemporary workers refuted Catani's claims (Ghon and Preyss [2] and Luerssen[3]), whilst among modern workers Fildes,[5] Rivers,[7] Putnam and Gay,[8] Davis,[9] and others have obtained uniformly negative results. Catani apparently failed because the test employed by him for the absence of hæmoglobin in his media was not sufficiently delicate; he made use only of the spectroscope as a test for blood pigment. It is now known that minute quantities of blood too small to be detected by this means are quite sufficient for the growth of the bacillus of influenza. The findings of some of the more modern workers are open to the same criticism.

As already indicated, the actual nature of the substance or substances required for the growth of *B. influenzæ* has also been the subject of considerable inquiry. It has been determined that two factors are necessary, both of which are to be found in blood—one derived from blood pigment and the other from the non-pigment fraction (Fildes). We have used above the term blood-pigment factor instead of hæmoglobin, for the fact is that hæmoglobin itself is incapable of allowing growth, which is determined rather by traces of methæmoglobin present. Ordinary human blood-agar grows *B. influenzæ* only feebly, while if the same medium has been just brought to the boil luxuriant growths are obtained (Leventhal's medium). The chief effect of the heating apparently is to change the hæmoglobin into methæmoglobin or some pigment derivative. This pigment-derived substance is heat-resisting, and with one exception (Thjotta) has not been found outside blood. Thjotta's results are so diametrically opposed to those of Fildes, Davis, and others that they cannot be accepted without further proof. The second substance necessary for the growth is heat-labile; as well as in blood it has been found in various animal and plant tissues (yeast and potato extracts). Although in agreement with Terada's claim [10] that the bacillus of influenza should not be called *hæmoglobinophilic*, the researches enumerated above do emphasise its strictly *hæmophilic* nature.

EX-SERVICE MEN MENTALLY AFFECTED.

Two questions asked in the House of Commons shortly before it adjourned related to the care of sailors and soldiers who took part in the war and whose minds, as the result of their service, have become affected. The whole subject of the conditions in which such men are treated is unquestionably one in which not only their relatives but the public are deeply interested. It is felt by many that a clear distinction should be made between those who, through fighting in the defence of their country have become of unsound mind, and those other unfortunates who are the normal inmates of "lunatic asylums"—we use the historic term intentionally. The first of the questions referred to, asked by Capt. C. E. Loseby, M.P., elicited the reply that there are now about 6210 ex-service men receiving treatment in county or borough asylums at the cost of the Ministry of Pensions, and that of these 4110 have dependents eligible for and in receipt of treatment allowances—that is to say, that they receive payments dependent upon the degree of mental incapacity affecting the man in the asylum. The slur attaching to the wife, and even more to the children, of the man known by their neighbours to be in an asylum falls upon them. The second question, asked by Mr. Gillies, M.P., had reference to the provision of institutions by the Board of Control for ex-service men, who are not certifiable as of unsound mind. From the reply it is gathered that there are no such institutions in existence, and secondly, that as to this class of case, steps have been taken by the Ministry of Pensions to secure for all uncertifiable ex-service officers and men, whose condition is due to war service, hospital treatment under the control of the Ministry, entirely independent of lunacy adminis-

[1] Catani, A.: Zeitschr. f. Hyg. und Infektionskrankh., 1901, vol. xxxvi., p. 29.
[2] Ghon, A., and v. Preyss, W.: Centralbl. f. Bakteriol. Orig., 1902, vol. xxxii., p. 90.
[3] Luerssen, A.: Ibid., 1904, vol. xxxv., p. 434.
[4] Thjotta, T.: Journ. Exper. Med., 1921, vol. xxxiii., p. 763.
[5] Fildes, P.: Brit. Journ. of Exper. Path., 1921, vol. ii., p. 16.
[6] Williams and Povitzky, O. R.: Journ. Med. Research, 1921, vol. xlii., p. 405.
[7] Rivers, I. M., and Poole, A. K.: Bulletin Johns Hopkins Hosp., 1921, xxxii., p. 202.
[8] Putnam, J. J., and Gay, D. M.: Journ. Med. Research, 1920, vol. lxii., p. 1.
[9] Davis, D. J.: Journ. of Infectious Diseases, 1921, vol. xxix., pp., 171, 178, 187.
[10] Terada, M.: The Japan Medical World, 1921, vol. i., p. 8.

tration—the provision has been made in the Ministry neurasthenic hospitals for the accommodation and treatment by trained medical officers of the cases referred to in the question.

What question and answer did not elicit was whether the provision of "Ministry neurasthenic hospitals" has been sufficient, and whether the combination of the neurasthenic hospitals with hospital treatment under the control of the Minister of Pensions is achieving success. It must best be known by the relatives of patients, and by medical men whose advice has been invoked independently of the Ministry, whether the neurasthenic hospitals referred to are full and overfull, or are able to receive suitable cases whenever they arise; and, also, whether the treatment afforded in hospitals under the Minister's control is always the most suitable for the individual case. We are inclined to believe that the question of the Minister's control may sometimes prevent the patient's treatment at an institution which would be open to him, and suitable for his case, and that questions of economy may intervene to render the treatment of ex-service men mentally affected less effective than it should be. Their case and that of their relatives is a very hard one. In many instances the disability will continue for a long time or perhaps will be permanent. The removal of all certified ex-service men from public asylums would no doubt entail some expense to the Treasury, but camps and buildings must now be standing vacant and under Government control the use of which, it is submitted, might be seriously considered. Moreover, the treatment now accorded is not being given without expenditure. The public is rightly jealous of increased expenditure by any Government department, but the removal of the stigma of the asylum from sailors and soldiers broken in the war would make an appeal to universal sympathy.

MONOPOLY IN POISON GAS.

WERE it not for such lurid writing as Mr. H. W. Nevinson's account of his visit to the great American poison gas-works at Edgewood. Baltimore, in the *Manchester Guardian* for Dec. 2nd, interest in gas warfare might be said to be flagging. The fact that Major V. Lefebure's "Riddle of the Rhine"[1] deals in great part with the history of gas warfare, and the production of war chemicals does not commend the book to the medical any more than to the general reader at the present time. Nevertheless, it conveys a lesson for peace conditions, as for war, which cannot be regarded lightly by the great nations other than Germany. Major Lefebure, himself a trained chemist, had opportunities for investigating his subject from many points of view, first in the field of battle, later as a liaison officer, and finally as a member of Inter-Allied Missions to the German Chemical Factories after the Armistice. With this first-hand information he has been able to place the issue before the public with praiseworthy clearness. He shows in detail how the success with which Germany was able to deluge the Allies with new and unexpected poisons was directly due to the facilities provided by her highly organised chemical industry. The toxic materials employed in war were organic compounds prepared in great part from the same raw materials as had been used in peace-time for the manufacture of synthetic drugs and aniline dyes. In most instances, details of which are given, the manufacturing plant normally devoted to the production of ordinary commercial products was adapted with only slight modifications for the elaboration of deadly poisons. A striking example is mustard-gas, which was manufactured on the lines ordinarily followed in the preparation of synthetic indigo. Even for explosives the chemical factories provided the essential elements, notably the Haber nitrogen fixation plant, by means of which ammonia and nitrates could be obtained when supplies of nitre were stopped. The facilities enjoyed by Germany in the secret and rapid provision of these war materials were in strong contrast with the difficulties encountered by the Allies, who not only had to build new and specialised factories for the manufacture of special substances, but in many cases to institute difficult and prolonged research before methods suitable for full-scale production could be elaborated. For the future the moral is obvious. If wars are to recur any huge organic chemical industry must be regarded as potential armament in the modern sense, and it would be in the highest degree inadvisable that one country alone should possess this overwhelming initial advantage. But apart from any consideration of war, it is not to the advantage of any branch of scientific progress in other countries that Germany should in future retain the dominant position that she has had in the past in the realm of chemical research and manufacture.

[1] London: W. Collins and Co., Ltd., 1921. Pp. 279. 10*s*. 6*d*.

EXPERIMENTAL RICKETS.

PRELIMINARY reports of the work done by Dr. E. Mellanby on the causation of rickets have appeared in previous numbers of THE LANCET.[1] The present monograph[2] gives the experimental evidence on which these reports were based, and it brings up to date the record of five years' work and the result of observations on no less than 400 puppies. A brief account is given of the earlier experiments which led to the exclusion of certain possible causative factors and which pointed to rickets being a problem in dietetics, more particularly centring round a disturbance in calcium metabolism. The criteria by which the presence or absence and the severity are to be judged are discussed and compared; the external appearance of the puppies, radiograms of their bones, the calcium contents of the shafts of the bones, and the histological appearance form the basis for report. There is general agreement in the results obtained by these methods, though there are occasions when some difference is apparent, differences which are in part capable of ready explanation and which in part point out the need for further research. The earlier experiments led to the evolution of a diet which produced rapid and marked rickets in well-growing puppies. This diet remains the basis of the later work except that the amount of bread it contains was controlled in the later experiments. By additions to this basic diet of fats and oils the relative anti-rachitic influence of the various substances was estimated; thus it was found that cod-liver oil had the most effect in promoting calcification of bone, and linseed oil and babassu oil little or no effect. The question is discussed as to whether the anti-rachitic factor, which ricket-preventing substances are presumed to contain, is the same as fat-soluble A-vitamin, and from the identity in distribution in the several fats and oils and their mode of action the author inclines to the view that anti-rachitic and fat-soluble A-vitamins are the same. There are interesting experiments testing the activity of other food factors in the ætiology of rickets. Thus it was found that protein has a definite anti-rachitic effect while carbohydrate tends to promote the development of rickets. Further experiments bear on the question of exercise in its relation to rickets, and the author compares its influence to that of protein in preventing or modifying the disease.

The author takes a wide view of the subject, as is evident from the short summary given above, besides which other factors, such as infection and the possibility of thyroid extract modifying the disease, are discussed. In fact, while there were at one time two somewhat opposed schools of thought, the one holding the view that rickets is a food-deficiency disease and the other maintaining that it is primarily the result of bad external environment and deficient exercise, Dr.

[1] THE LANCET, 1919, i., 407; 1920, i., 604.
[2] Experimental Rickets, by Edward Mellanby, M.A., M.D., Medical Research Council, Special Report Series, No. 61.

Mellanby's opinion, as expressed in this monograph, tends to compromise between these extreme opinions. Thus an anti-rachitic factor, "probably identical with the fat-soluble vitamin," together with sufficient calcium and phosphorus in the diet, are considered factors of first importance in preventing rickets; meat and exercise assist in prevention. Restriction of any of the four factors named or excess of carbohydrate food promotes the development of rickets. These results agree well with clinical opinion and practice. The research emphasises the importance of a balanced diet and indicates that too much of one substance may be as harmful as too little of another. The work is being actively prosecuted, and the author states that the present publication is to be regarded as an interim report.

PLAGUE AND SMALL MAMMALS.

WE commented last week on Dr. L. G. Haydon's article (THE LANCET, Nov. 26th, p. 1103) which dealt with sporadic outbreaks of plague in South Africa, and drew freely upon information supplied to him by Dr. J. Alexander Mitchell, Secretary for Public Health and Chief Health Officer to the Union of South Africa. Dr. Mitchell has since sent us a copy of a paper, read by him at the South African Medical Congress in October, which deals fully with the fauna of the infected country, and includes an extremely valuable account of the fleas found on the various animals that have come under notice during these investigations. Dr. Mitchell lays particular emphasis on the fact that the human cases were nearly always infected from gerbilles; evidence of recent migration and desertion of gerbille burrows was obtained in a few instances, mummified carcases and skeletons actually being found, showing that the epizoötic was a severe one. Most of the plague cases occurred in the area frequented by the gerbille.

POIKILODERMA ATROPHICANS VASCULARE.

ACCORDING to Dr. John E. Lane [1] of New Haven, Connecticut, who reports a case under his care in a man aged 30, and another under the care of Dr. Oliver S. Ormsby, of Chicago, only 12 previous cases have been published, nine in German, two in French, and one in Russian literature, of the remarkable skin condition, described by E. Jacobi in 1906, under the name of poikiloderma atrophicans vasculare. Of the 14 cases on record, nine were males and five females. The youngest was 6 years of age, two were 41, and the rest between 20 and 33. In all the cases in which reference was made to it the Wassermann reaction was negative. In a few instances other diseases were associated with it, such as pulmonary tuberculosis, myositis, rheumatic or gouty manifestations, juvenile muscular atrophy, calcareous deposits, malaria, ichthyosis, and lymphosarcoma. The dermatosis usually begins in late youth or early adult life, is of very slow evolution, and of approximately symmetrical distribution. It is attended by mild pruritus and presents as its chief manifestations telangiectasis, pigmentation, and later capillary hæmorrhages and atrophy. Histologically there are two stages, an inflammatory and an atrophic. The inflammatory stage is manifested by round-celled infiltration and dilatation of the superficial vessels and alternate increase and diminution or absence of pigment, while the atrophic stage is characterised by flattening of the papillæ, degeneration and disappearance of the elastic tissue, and atrophy of the collagen bundles. Poikiloderma has been variously classed as a disease *sui generis* (Jacobi), a toxic erythema (Ehrmann), lupus erythematosus (Kreibich and Arndt), atypical scleroderma (Jadassohn), and diffuse idiopathic atrophy (Darier, Brocq). The conditions for which poikiloderma may possibly be mistaken are Schamberg's progressive pigmentary disease, Majocchi's disease and generalised telangiectasia connected with syphilis. Nothing is known as to the ætiology, but it has been suggested that toxic bodies acting on the vessels and connective tissue may be factors in its causation, while the theory of an embryonic defect has been maintained by Glück and Bettmann.

[1] Archives of Dermatology and Syphilology, November, 1921.

CORONERS' JURIES AND THE L.C.C.

Two pieces of war legislation which have proved of value under peace conditions were the Acts of 1917–18 governing the size and attendance of coroners' juries, and the London County Council is anxious to preserve both these measures as a permanent reform in the procedure of coroners' courts. The Coroners (Emergency Provisions) Act, 1917, provided that "seven" and "eleven" should be substituted for "twelve" and "twenty-three" as the minimum and maximum numbers of jurors summoned by a coroner to form a jury. The question of reducing the number of inquests held with a jury was dealt with by the Juries Act, 1918. Section 7 empowered a coroner to hold an inquest without a jury, if he was satisfied that it was proper to do so. He was prohibited from exercising this discretion in cases where (*a*) death occurred in prison, (*b*) death occurred in such circumstances as to require an inquest under an Act other than the Coroners Act, (*c*) there appeared to the coroner reason for summoning a jury or for suspecting that the deceased had come to his death by murder or manslaughter. Unless Parliament takes further steps both Acts will cease to operate on Feb. 28th, 1922. These war-time relaxations of the law had previously been advocated by the London County Council, and their working has afforded a large measure of relief to the community in the matter of jury service. For instance, the coroners' vouchers in three districts, over a limited period, show that out of 152 inquests no fewer than 140 were held without a jury. No complaint has been received and considerable financial saving has been effected. Before 1917, jurors' fees in the County of London amounted to more than £3000 a year, but this amount was reduced in 1919 to £533 10*s*. Moreover, in many cases of sudden deaths at infirmaries and hospitals, the coroners have been able to view the body at the place of death, thus saving the cost of its removal to a public mortuary. This course would not have been possible if a jury had been required to view the body. Acting on the recommendation of its Public Control Committee, the County Council has therefore decided, in the interests of economy and public convenience, to urge the Government to take steps to give permanent effect to these useful provisions.

THE SAFETY OF CHLORINATED WATER.

IT is unreasonable to expect tap-water to taste like lemonade, but it should, at least, not be nauseating. The rapid and careless way in which chlorination had to be carried out for troops on foreign service bred in many of them a permanent prejudice against any kind of "doped" water which has carried over into civil life. Of course, the sterilisation of water by means of chlorine long antedates the late war, and Sir Alexander Houston recounts the well-meant criticism directed against him in connexion with the chlorination of the water-supply at Lincoln as long ago as 1905. During the war chlorination secured its place as a universal method of making any doubtful sample of water safe for immediate use as a beverage, and a large part of London's water was treated in this way. The removal of the taste after sterilisation has been effected is now a simple matter, and was set out in a recent circular issued by the Ministry of Health. Prejudice being thus on the wane, little alarm was created in June last, either on the spot or in other countries having organised water-supplies, when a coroner's jury in Chester County, Pennsylvania, returned the sudden death of a local citizen as due to "general systemic debility caused by chemicalised water, which produced a severe gastro-enteritis followed by cardiac failure." Pending the completion of new filters, the Pennsylvania Department of Health is prudently disinfecting its

public supply by the addition of chlorinated lime. The 65-year old man on whom the inquest was held, on returning home after a day of strenuous activity, retired to bed feeling ill; vomiting and purging set in, and he died stuporous about 30 hours after. His house was situated about half a mile from the well where chlorinated lime was added to the water, and no discomfort or illness accredited to the water-supply was reported from any of the intermediate 25 or 30 connexions along the main. Assuming that the deceased man drank as much as two quarts of public water daily, he would have taken no more than one-eightieth of the curative dose of chlorinated lime as set down in the American Pharmacopœia. Fortunately for the credit of the water, an expert pathologist of the University of Pennsylvania performed an autopsy which showed no evidence of inflammation of the alimentary tract and led him to the opinion that death was due to dilatation of the heart, possibly brought on by exertion in a subject of marked arterio-sclerosis. This autopsy took place six days *after* the jury's verdict and led to a re-empanelment, when a supplementary report was issued "that chlorine was neither directly nor indirectly the cause of death." The fact that the present constitution of society makes it difficult to overtake a lie was, we presume, the reason for reporting the case fully in the last issue to hand of the U.S. Public Health Reports.

FURTHER WORK ON EXPERIMENTAL TAR CANCER.

WE have referred recently to the importance of this new line of experimental cancer research. How actively work in this direction is proceeding is evident from the fact that we have to record the publication of two further papers on this subject from two new centres of cancer research. One by Dr. Deelman[1] is dated from the Antoni van Leewenhoek House in Amsterdam. Both carcinoma and sarcoma were produced as the result of the repeated application of tar to the skin of mice. The paper is in the Dutch language, so that, unfortunately, its contents are not readily accessible. But the author expresses the opinion that he has observed in one case a carcinoma arising from a benign growth. The other paper[2] by Prof. B. Bloch, the Director of the Dermatological Clinic in Zurich, and his assistant, Dr. W. Dreifuss, registers a further advance, because these authors have succeeded in locating the cancer-producing agent of coal tar in the fraction with a boiling-point of over 300. This fraction is soluble in benzol and retains its activity after distillation. This fraction gave the remarkable result that 100 per cent. of the mice to which it was applied gave rapidly growing carcinomata within four months. The malignant character of these tumours was established by their morphology, by their infiltrative and destructive growth, and by the spontaneous formation of metastases in lymph glands and lungs. The hydrocarbons with a lower boiling-point also produced tumours, but these were of a benign character. It is probable that further work along these lines will yield important and novel information on the difficult and much debated problem of the relationship between benign and malignant new growths. A further communication dealing in detail with the chemical aspect of the various tar fractions and their biological properties is promised. Another interesting observation by these authors is, that while tumours could be produced in rabbits and in mice by the application of tar, guinea-pigs have so far failed to react in the same manner. Although the authors do not comment upon this negative result, it is of interest, because it emphasises the susceptibility of the cell as an important factor in the genesis of cancer. Differences in the susceptibility of cells to react to a given irritant by the cancerous change exist not only between different species, but between different individuals in the same species, between different tissues in the same individual, and even between different cells in the same tissue.

[1] Nederl. Tijkdschrift voor Geneeskunde, 1921, Part 2, No. 20 (October).
[2] Schweizerische med. Wochenschrift, Nov. 10th, 1921.

METEOROLOGY AND BACTERIAL INFECTION.

THE season is one when the "common cold" is in evidence and when the doctor's inability to prevent or cut it short is apt to lead to some reproach of medical skill. Something might be hoped from a collective study of the medical reports available under the Insurance Acts. Do the colds of sedentary workers last longer than those of outdoor workers? Does keeping the house answer better than going out? Are summer colds the most intractable? The answer to questions such as these is outside any possible individual experience but should be within the scope of concerted inquiry. In the meantime help is welcome from any source, and certain passages in Dr. E. J. Butler's recent address to the Association of Economic Biologists are, at all events, suggestive. In the absence of a blood-supply and of anything resembling a mucous membrane, the plant can hardly be expected to throw any direct light on catarrhal conditions in animals. But Dr. Butler, who is director of the Imperial Bureau of Mycology, has found one direction in which plant disease may have a bearing on the problem. He has shown that such relatively small variations of temperature as 8 or 10° C., and of humidity as 5 per cent., are sufficient in certain cases to determine whether a parasite can cause a 100 per cent. infection or none at all. Plants lend themselves to such study inasmuch as they can be grown under constant conditions of humidity and temperature in special chambers when the exact relations of their diseases to the environment can be determined. This relation, singularly close in some cases, has to be worked out on the parasite and host together, for the host-parasite complex, as it is called, does not always behave in the same way as either alone. Parasites that are perfectly harmless under one set of conditions will infect freely under conditions not very widely different. We should like to see the main facts of this relationship in plant diseases brought up for discussion at one of the societies specially interested in climatic medicine. The way has already been prepared by such a study as that of Colonel C. A. Gill on the Rôle of Meteorology in Malaria in a recent issue of the *Indian Journal of Medical Research*.

SELF-DISINFECTION IN THE CAMPAIGN AGAINST VENEREAL DISEASES.

IN the *International Journal of Public Health* for November–December, 1921, this question is discussed by Sir G. Archdall Reid, who advocates the instruction of the individual in methods of self-disinfection, and by Dr. Otto May, who presents the case against. Both articles should be read, but much that they contain is mere beating of the wind. It is a matter of regret that the protagonists on both sides of this question cannot see their way to join hands and oppose a united front to a common evil, for there is a line of research, not likely to be barren, to which they might well devote their attention.

The present state of affairs is confusing and annoying. Both parties to this discussion, and the societies which they represent, are agreed that "the best way of avoiding venereal disease is to abstain from promiscuous sexual intercourse." That is the ideal, but human nature and civilisation being what they are, Sir Archdall Reid holds, in effect, that the ideal is unattainable. He is persuaded of the futility of "exhortation" and advocates that "prospective sinners shall receive instruction in disinfection." How this instruction is to be imparted he does not sufficiently make clear. If it is to be given by posters displayed in lavatories, worded so ambiguously that they will not convey their full meaning to "an innocent boy," it seems to us it will do more than fail. Yet this is one means by which Sir Archdall Reid suggests the necessary information should be disseminated. In

support of his position he quotes many impressive statistics from the experience of the army. But the value of his statistical evidence is seriously impaired by the fact that all of it deals with men under discipline. The casual civilian is hardly likely to carry out self-disinfection with anything like the thoroughness of the soldier—who, in addition to a suitable opportunity for self-disinfection in an "ablution hut," has a lively knowledge from the "exhortations" he has heard of the seriousness of venereal disease. In the matter of statistical evidence, however, Sir Archdall Reid is effectively countered by new facts put forward by Dr. Otto May, who makes use of figures quoted by Prof. Galewsky at the North European Red Cross Regional Conference on Venereal Diseases held in May at Copenhagen. In Germany, methods of self-disinfection have been taught with German thoroughness, and prophylactic agents of the recognised kind are easily procurable. The figures speak for themselves. In Dresden in 1919 14 boys and 60 girls between the ages of 14 and 18 attended Galewsky's Venereal Clinic for treatment. In 1920 there were 105 boys and 116 girls between the same ages, and in the first three months of 1921 the figures were: boys, 33; girls, 61. One must be careful in deducing conclusions from statistics, but these figures are very significant. Further, Dr. Otto May quotes figures from a certain London clinic which show that of 375 infected men who came for treatment 101 stated that they had used chemical disinfectants after exposure.

Any medical man actively engaged in the treatment of venereal disease can cite cases where "disinfection" immediately after intercourse has failed to prevent disease. It is often said that morality based on fear is a poor kind of morality, but surely it is better than immorality encouraged by a false sense of security. May we suggest to Sir Archdall Reid and Dr. Otto May and the societies they represent that, with this week's great political example before them, they declare a truce to all wordy warfare and devote the next 12 months to collecting evidence from the medical officers in charge of 100 of the larger V.D. clinics on these two points: 1. What proportion of patients attending with fresh infections used disinfecting agents (and if so, what) (*a*) before intercourse, and (*b*) immediately after intercourse. 2. To what extent does the use of calomel ointment or other mercurial immediately before or immediately after intercourse delay the appearance of, or modify the characters of, the primary sore. If incomplete "disinfection" makes a primary sore atypical it may lead to delay in the institution of proper treatment, and so bring about disaster. Reliable evidence as to these points would do more to enable the man with an open mind to come to a right decision in this vexed question than any of the arguments that have hitherto been advanced.

AN important conference upon serological problems will take place in London on Monday, Dec. 12th, and following days. The conference has been convened by the Health Committee of the League of Nations and will meet under the presidency of Prof. Th. Madsen, Director of the State Serological Institute of Denmark, who is the president of that Committee. Distinguished workers from laboratories in the following countries will attend the conference: Austria, Belgium, Denmark, France, Germany, Great Britain, Italy, Japan, Poland, and Switzerland. It is hoped that the President of the Office International d'Hygiène Publique and an American representative will also be present. The British delegates will be nominated by the Medical Research Council. By the courtesy of the Government the meetings will take place at the Ministry of Health. The conference will be occupied with a consideration of existing methods of standardising sera and the possibilities of attaining an agreed international system of serological standards. It will also take count of the methods used in leading laboratories for the serum diagnosis of syphilis. Arrangements for new investigations will be discussed.

GENERAL COUNCIL OF MEDICAL EDUCATION AND REGISTRATION.

(Concluded.)

FRIDAY, NOV. 25TH.

Pharmacopœia Committee.

The PRESIDENT, as chairman of the Committee, presented the report to the Council. The number of copies of the British Pharmacopœia, 1914, sold by the publishers between May 21st, 1921, and Nov. 19th, 1921, was 1427. The number sold in the year ending Nov. 19th, 1921, was therefore 2407. The total number sold since the date of publication was 41,385. The stock in hand was sufficient to meet the present demand for some time to come. On behalf of the Committee, Sir Nestor Tirard and Prof. Greenish, as editors of the British Pharmacopœia, 1914, had attended a conference called by the authorities of the National Physical Laboratory to consider the question of the official testing and marking of glassware used for purposes of measurement. It was understood that, as a result of the conference, an advisory committee is likely to be set up, on which the General Medical Council would have representation. It was desirable that some of the difficulties in respect of the standardisation of measuring vessels, indicated in the preface to the British Pharmacopœia, 1914, should be considered and, if possible, obviated before the next revision of the work. A cordial offer of coöperation with the Committee in matters of common pharmacopœial interest had been received from the chairman of the Committee of Revision of the Pharmacopœia of the United States of America, 1920–30. The Committee had, on behalf of the Council, welcomed the offer warmly and accepted it, being assured that such coöperation cannot but be of the greatest importance, both in the interest of the respective Pharmacopœias and in that of international comity and friendship.

Students' Registration Committee.

Sir NORMAN MOORE, chairman of the Committee, presented this report to the Council. The report was adopted. Various applications for exceptional registration or antedating of the commencement of professional study had been considered by the Committee and were made the subjects of recommendation in the report. The following institutions, having applied for the approval of the Council, and satisfactory evidence as to their visitation having been shown, were added to the list of those recognised by a licensing body and approved by the Council: Burnley: Municipal College; Cheltenham: Dean Close School; Ipswich: High School; London: North London Collegiate School; Streatham Hill High School; Wimbledon High School; Shrewsbury: Shrewsbury School.

Education Committee.

Dr. MACKAY, chairman of the Committee, made an oral interim report to the effect that the work of the Curriculum Committee was going on in a very satisfactory manner. Four English subcommittees had been reported, and a conjoint report had been presented; in the case of Scotland and Ireland, the conjoint stage had not been reached. He proposed that the final reports of all the committees when completed should be printed and circulated among all the members of all the committees; that any further comments by members of the committee on proposals submitted by other committees should be transmitted at as early a date as possible to himself; and that he should then arrange for a joint meeting of all chairmen of committees, with the object of arranging for due consideration of the changes; that thereafter all the reports along with the comments thereon made by the chairmen be transmitted to the Education Committee, which should then prepare a general statement for the consideration of the Council at its next meeting in May, 1922. The President was

authorised to call a special meeting of the Education Committee for this purpose should it be found necessary before the beginning of the May session.

On question put from the chair, the chairman of the Education Committee was requested to hold a meeting of as many of the conveners of the committees as was possible that afternoon, with a view to accelerating the preparation of the Scottish and Irish conjoint reports and of the final report.

In a further oral interim report the chairman of the Education Committee indicated some of the steps proposed in order that the standard of preliminary examination should in accordance with the Council's resolution be raised to the level of that required in other learned professions; and that from Jan. 1st, 1923, all students should be required as a condition of registration to pass an examination in General Education equivalent to that required by British universities from matriculants in Arts or pure Science, and proposed that his interim report should be entered in the minutes; but that the discussion thereon should be postponed.

After some discussion an amendment, proposed by Sir SYDNEY RUSSELL-WELLS and seconded by Dr. RUSSELL, that the debate on the motion be adjourned, was agreed to. The Council then adjourned.

SATURDAY, NOV. 26TH.

The Report of the Examination Committee.

Dr. NORMAN WALKER, chairman of the Committee, presented this report on the series of inspections of qualifying examinations, and began by a reference to the comparatively short time occupied by the inspection. The first inspection took place in April, 1920, and all the inspections, with the exception of those of the midwifery examination at Cambridge, the surgery examination of St. Andrews, and the examinations of the National University of Ireland held in Cork and Galway, had now been completed. The inspectors on medicine and surgery had reported that all the examinations were "sufficient," but they had made numerous suggestions for the improvement of examinations, many of which they reported to be already excellent. The report of the inspector on midwifery required closer consideration. The examination in midwifery of the 23 licensing bodies were divided into four classes, as follows:—

1. The inspector reported after personal inspection that the examinations of Bristol, Birmingham, Durham, Manchester, St. Andrews, Glasgow, Belfast, and Dublin Universities, the Apothecaries' Hall of Dublin, and the Irish Conjoint Board were "sufficient."

2. He was unable to be present at the clinical examinations in Leeds and Edinburgh, but accepted the explanation of the examiners as to the methods they followed and declared the examinations "sufficient."

3. Of the examinations of the Apothecaries' Society, the London Conjoint, the Universities of Liverpool, Oxford, and Sheffield, the Scottish Conjoint Board, the University of Aberdeen, and the National University of Ireland, he said, not always in the same words, but always apparently with the same meaning, "in the absence of a clinical examination I cannot consider this examination sufficient."

4. Of the examination of the University of London he said "this examination is not sufficient."

It was manifest that Sir William Smyly held strong views on the necessity of raising the level of the practice on midwifery and gynæcology, and of examinations in these subjects; his varying forms of expression suggested warning rather than condemnation of the bodies included in Class 3.

The Committee did not understand Sir William Smyly to mean that, apart from the question of a clinical examination, he was dissatisfied with the standard of proficiency actually required by any of these licensing bodies, or that any candidates passed the examination who should have been rejected. The Committee was in full sympathy with the inspector's object of raising the standard of examination and practice; and while it recognised the difficulties associated with a clinical examination in midwifery and gynæcology, it regarded the matter as of such importance that it recommended the Council to draw the attention of the licensing bodies in Classes 3 and 4 to the inspector's report. With reference to Class 4, the body concerned, the University of London, had adopted resolutions, now in operation, (1) appointing additional examiners; (2) arranging that students shall not be examined orally in the presence of one examiner only; and (3) requiring from each candidate a certificate of instruction in clinical midwifery and gynæcology. The Committee recommended an early re-inspection of the examination in midwifery in this University.

Dr. Tooth had reported on the efficient teaching of and examination in pathology, which in certain of the universities was a part of the final examination. He did not apparently regard the position of pharmacology so favourably, and advised that more attention be devoted to the correct writing of prescriptions. A matter frequently referred to by the inspectors was the disregarding by certain of the licensing bodies of the recommendation of the Council (No. 7) that students should not be examined by one examiner alone. Most of the bodies into whose examination the practice had crept indicated in their remarks on the inspector's report that it would not occur in future. The strict acceptance of the Council's recommendation meant more examiners, but also meant better and fairer examination. The Committee urged that its importance be impressed on all the bodies.

Examination in Clinical Medicine.—The Committee noted that the time allotted to the candidate for the "long" or "commentary" case varied considerably, being three hours in several examinations, and ten minutes in one. The Committee was of opinion that it was very important to impress upon the student the necessity of careful and thorough examination of all patients; that at least an hour and a half should be devoted to this part of the examination; and that it considered that a recommendation to this effect should be made.

Evidence of Further Study after Rejection.—Recommendation 4, adopted by the Council, was as follows: "A candidate remitted in any subject should, before he is admitted to re-examination, be required to produce satisfactory evidence that he has pursued the study of that subject during the interval of remission." This recommendation had not been very closely observed by the bodies, which might partly explain cases referred to by the inspector on surgery of candidates appearing for the tenth time for examination. Incidentally on this recommendation another matter arose: in those bodies where examinations were held only twice yearly rejection necessarily involved a six months' period of further study, and no suggestion was made that the period need ever be longer than that; but those bodies who held more frequent examinations should be recommended to look more closely into the question of the period of further study, and instruct their examiners to pay greater attention to the regulations which in most cases exist.

Interchange of Examiners.—On collating the reports it was noted that the names of several examiners appeared in connexion with the examinations of more than one licensing body. Quite a number examine in two; three is not uncommon; and two, one in surgery and one in midwifery, examine in four. There was much to be said for a more general adoption of this plan; not only did it give the examiners greater experience, but it obviously tended to maintain a uniformity of method and an equality of standard such as is desired by those who advocated adoption of the one-portal system. Dr. Tooth had made the interesting suggestion that an interchange of visits of inspection should be arranged between representatives of all the universities and licensing bodies.

Marking.—Whatever the total figure—which varied from 55 in the English Conjoint to 1200 in the University of Manchester—the pass standard was almost invariably 50 per cent. of the maximum figure. It would assist the Council if the various examining boards would agree on a uniform system of marking, but it should be the universal practice that no one who was unable to obtain 50 per cent. in clinical medicine or clinical surgery should be admitted to the Medical Register. On the question of exemption, the Council's recommendation that a 60 per cent. mark should be required was not universally adopted; some bodies admitted to one subject at a time and gave a pass on a 50

per cent. mark therein. It had been suggested that this practice was growing; it was clearly contrary to the recommendations of the Council.

Unity of Final Examination.—The inspectors on medicine and surgery, the latter in more forcible terms than the former, both advocated that candidates should either pass all three subjects (medicine, surgery, and midwifery) at one sitting, or that, if exemption in single subjects were permitted, candidates should be required to complete the whole examination within some prescribed period. The inspector on medicine admitted that, in those bodies which included pathology, pharmacology, forensic medicine, and hygiene in their final examination, the burden on the candidate would be heavy, and he suggested that the bodies which followed this plan might adopt the one generally followed elsewhere, and arrange for a pre-final examination in these subjects. The Committee agreed to recommend to the Council that it should be a recommendation to the bodies that the final examination in the three subjects of medicine, surgery, and midwifery should be completed within a period of 18 months. The Committee thought that the separation of the examination in clinical medicine and clinical surgery from the systematic parts of the examinations in these subjects is inadmissible.

Mental Diseases.—Several of the bodies did not profess to include this subject; others included one or two questions in the medicine paper; in others it appeared in the syllabus. Liverpool and Bristol had a separate paper on the subject, and Durham, Dublin, and Birmingham each held a clinical examination.

Diseases of Eye, Ear, and Throat.—The inspectors in medicine and surgery recommended that candidates' knowledge of these diseases should either be efficiently tested in the final examination, or should produce evidence that they had been sufficiently instructed and tested as to their knowledge of these subjects.

There was considerable discussion of the body of the report, several members of the Council expressing their satisfaction at the Committee's mention of the advantage to students of examination by two examiners sitting together rather than by a single examiner.

Sir ARTHUR CHANCE, referring to the fact that in the inspector's detailed consideration of examinations the words "no questions on mental diseases were put" occurred in the note on the Irish Conjoint Board, said that if mental diseases were admitted then such subjects as ophthalmology would also have to be included, and examination on the three main subjects of medicine, surgery, and midwifery would be lengthened and weakened.

Sir FRANCIS CHAMPNEYS pointed out that the inspection of examinations was not yet normal or fully recovered from the conditions imposed by the war. With regard to a clinical examination in midwifery, this was impossible to obtain in some places. Examining bodies had no control over the material. The difficult and essential things to teach were diagnosis and treatment of abnormal labour; clinical examination of ordinary cases would not give what was required. Fixed dates for examination were impossible in this connexion; a student should be taught manipulation and diagnosis in the course of his work, and strictly certificated by his instructor for purposes of examination.

Sir JAMES HODSDON, after referring to the difficulty of clinical examination in obstetrics and the importance of proper preparation of students for examinations, said that with reference to the system of marking the examiner's question to himself must not be "does this candidate deserve 50 or 60 per cent.?" but "is this candidate fitted to pass the examination?" He favoured the unity of the final examination, believing that a candidate tended to neglect further study of the subjects he had passed in. Only five licensing bodies at present required students to pass medicine, surgery, and midwifery at one time.

Dr. T. W. GRIFFITH said that it would injure the final examination to insist on pre-final special tests; it was well for students to expect examination in all parts of medicine.

Sir GILBERT BARLING pointed out that a candidate who failed several times in only one of three subjects was practically condemned to seek another career. He wished the Council to bear in mind that a new curriculum was being prepared, and supported the plan of certification of students in clinical midwifery.

Sir SYDNEY RUSSELL-WELLS expressed satisfaction that the Council was agreed concerning the wisdom of having two examiners sitting at a time, and spoke of the financial difficulty in this respect.

Mr. WARING stated that he had found the percentage method of marking more satisfactory than any other, and emphasised the importance of making students familiar with methods of examination in ophthalmology, oto-rhino-laryngology, &c.

Sir JOHN MOORE pointed out that with regard to the examination of the Irish Conjoint Board, the inspector had been rather hard on that body; he had merely come upon an examination in which mental disease happened not to be the subject of a question.

Prof. LITTLEJOHN regretted that the Council had never indicated at what period in a student's career he should be taught forensic medicine and public health subjects.

Sir JENNER VERRALL advised the Council not to be too much concerned with the convenience of examining bodies, and also emphasised the importance of examination by two examiners.

Dr. MACDONALD hoped that no discouragement would be cast upon any attempt to better the teaching of clinical medicine; midwifery was at present a disgrace to the profession.

Mr. TURNER pointed out that in the reports of all the papers given during the examinations inspected only two questions had dealt with venereal disease. At present the ordinary medical qualification did not permit a practitioner to obtain free material from the Government for treatment of these diseases; post-graduate evidence of knowledge was required by the authorities. The older generation was past praying for; the only hope in this matter was to equip the coming general practitioners thoroughly in this respect.

Sir EDWARD COEY-BIGGER remarked that the death-rate among midwifery cases was practically at a standstill, that something—in his opinion the teaching of the subject—was radically wrong, and more midwifery hospitals were needed.

Dr. MCVAIL agreed with Prof. Littlejohn that it was difficult to discuss the report before the report on the new curriculum had been issued. He had not noted much reference in the report to the machinery of examination. An early "block" should be provided so that a student could not go through the early subjects only to fail repeatedly at a later stage.

Dr. NORMAN WALKER answered various points which had arisen, and claimed that although the Examination and Education Committees might seem to interfere with one another in the matter of the curriculum, of which the report had not yet been issued, yet it would be a pity to hold up their work on that account. The clinical examination in midwifery was very easy in some places, very difficult in others, but improvement might be secured if the licensing bodies could be made to feel that the Council were serious with regard to this matter. He then presented the following recommendations of the Examination Committee, which were adopted by the Council:—

1. That the attention of those bodies who do not hold a clinical examination in midwifery and gynæcology should be drawn to the importance of observing No. 19 of the Council's recommendations.[1]

2. That the President be requested to arrange for a re-inspection of the examination in midwifery in London University at an early date.

3. That the importance of observing Recommendation 7—viz.: "A candidate should not be orally examined except in the presence of two examiners," should be impressed on all the bodies.

[1] Recommendations of the General Medical Council concerning Professional Examination, adopted June 9th, 1896, May 30th, 1907, and Nov. 26th, 1909, of which No. 19 reads as follows: "The final examination should include clinical and practical examinations in midwifery and gynæcology."

4. That in the examination in clinical medicine at least an hour should be allowed for the examination by the candidate of his principal case.

5. That candidates who obtain very low marks should be remitted for further study for a longer period than three months.

6. That in the final examination candidates should either pass all three subjects (medicine, surgery, and midwifery) at one sitting or be required to complete the whole of the final examination within a period of 18 months.

7. That the recommendations of the Council on professional examinations be revised, and that they be circulated in draft to all the bodies for their consideration and observations.

Education Committee.

The adjourned consideration of the draft report was resumed: the following were its main proposals:—

Examinations in Great Britain.—The Council will recognise the undernoted university examinations subject to the conditions specified below: The University of Oxford—Responsions; the University of Cambridge—Previous Examination; and the Matriculation Examination of the Universities of London, Durham, Scotland, Manchester, Liverpool, Leeds, Sheffield, Birmingham, Wales, and Bristol.

The conditions prescribed by the Council are: (1) The standard of the examination shall not be lower than that of the University Matriculation Examinations in the Faculties of Arts and Pure Science; (2) the certificate shall bear evidence that the candidate has passed in the following subjects—viz.: (1) English; (2) mathematics, elementary or additional, or a science—(*a*) physics; (*b*) chemistry; (*c*) physics and chemistry; (3) a language other than English; (4) any other subject or subjects embraced in the official list of the examining university.

Subject to the conditions specified above (Section I.), the Council will recognise all examinations conducted by recognised authorities in Great Britain accepted by one or more of the above-named universities as equivalent for purposes of matriculation within the accepting university to an examination named in the preceding list (Section I.). The Council will continue to recognise examinations conducted by bodies other than those (referred to in Section II.) directly recognised by the universities of Great Britain. Recognition will not be extended under this section to any examination unless the Council is satisfied (1) that in scope and standard it is equivalent to a recognised examination of a British university, and (2) that it fulfils the conditions specified by the Council (Section I.).

Examinations in Ireland.—Subject to the specified conditions (Section I.) the Council will recognise the entrance examination of the University of Dublin, and the matriculation examinations of the National University of Ireland, the Queen's University of Belfast, and the Royal College of Physicians and Surgeons in Ireland, and all examinations accepted by one or more of these bodies as equivalent for purposes of entrance or matriculations to the above-named examinations.

Colonial Examinations.—Subject to the specified conditions (Section I.) the Council will recognise all examinations of Colonial universities which are accepted by one or other of the British universities as equivalent for purposes of matriculation within the accepting university to an examination named in the list of examinations recognised by the Council (Section I.).

Restoration of a Name to the Register.

The Committee, having considered an application from John Shaw for restoration of his name to the Register (from which it was removed at his own request in 1908), recommended to the General Council that the Registrar be directed to restore to the Medical Register the name of Dr. John Shaw; and having also considered the application for removal of name of Miss Lillie M. A. Jones, recommended that it be not acceded to, on the ground that the Executive Committee is not satisfied that she has ceased to practise. The Council adopted these recommendations.

This concluded the business of the session.

EPSOM COLLEGE.—The Council of the College will shortly be awarding "France" pensions of £30 a year to medical men not under 55 years of age, whose income, independently of any allowance from the College, does not exceed £100 a year. Forms of application can be obtained from the secretary, Mr. J. Bernard Lamb, at 49, Bedford-square, London, W.C. 1.

A REPORT ON DIPHTHERIA.[1]

A PRELIMINARY note addressed to Sir GEORGE NEWMAN, Chief Medical Officer of the Ministry of Health, prefaces a report upon diphtheria made to the Ministry by Dr. MONCKTON COPEMAN, F.R.S. The note is written by Dr. G. S. BUCHANAN, C.B., Senior Medical Officer, Ministry of Health, and runs as follows:—

1.—*Schick Test and Active Immunisation Against Diphtheria.*

The report herewith submitted deals, inter alia, with the use of the Schick test as a means of recognising susceptibility to diphtheria, and with the method of conferring immunity, by means of inoculations of a standardised toxin-antitoxin mixture, on those who have been found to be susceptible to diphtheria by this test, or are assumed to be susceptible on other grounds. This system of diptheria prevention has been adopted on an extensive scale in New York, where prevalence of diphtheria has been greater and the mortality from this disease considerably higher than in this country. The object of its adoption is not the separation from the population of infective cases and carriers; it is assumed that risk of infection from such cases must always be considerable and to a large extent beyond control, and it is consequently considered preferable to adopt a method which secures a substantial immunity of the general population concerned, or at least of a large part of it. In order that this may be obtained on a sufficient scale, the New York system provides a medical service for carrying out the testing and immunising, especially in the school population. Steps are also taken to obtain the coöperation of medical practitioners who apply the Schick test, and where necessary undertake the immunisation, with material supplied to them from the New York State laboratories.

In his report Dr. Copeman has collected and set out some of the principal considerations and data regarding the Schick test and methods of immunising against diphtheria. With this he has combined the results of personal observations of these methods from his experience at Bristol and that of several collaborators, particularly Dr. D. S. Davies, Prof. Walker Hall, Dr. Nixon, and Dr. Norgate at Bristol, and Dr. O'Brien of the Wellcome Laboratories.

The observations on this subject in the report will, it is anticipated, be useful to medical officers of health and hospital and school medical officers who have specially to deal with diphtheria outbreaks in this country. It would be premature to advise that in English communities general immunisation of persons susceptible to diphtheria should be attempted on the New York scale. More information and experience would be necessary before this could be recommended, and it would be necessary to be satisfied that equally good results cannot be obtained by extension and improvement of the methods of diphtheria prevention on which we rely at present. At the same time, there are already circumstances in which the evidence available may be considered to warrant a trial of the Schick reaction and toxin-antitoxin immunisation. For example, a parent who for one or another cause is specially anxious that his child should avoid all possible risk of contracting diphtheria, may ask whether medical science cannot now provide a means by which the degree of the child's susceptibility can be estimated, and by which, if the susceptibility is great, the child can be protected for at least some years without any substantial risk, and with at most only a transient and insignificant disturbance of health, as the result of the inoculation. A similar question may be asked by nurses and others likely to come much into contact with diphtheria cases, or again by medical officers of residential schools and other limited communities at a time when diphtheria is epidemic. The information now available—much of which is epitomised in Dr. Copeman's report—shows that there is good warrant for an affirmative answer to such questions.

The technique of the Schick test is comparatively simple, though, like all scientific methods, it requires some little experience before the observer can have confidence in himself and in his interpretation of the reactions obtained. Its essential points are now fully described in medical literature and some practical suggestions—especially as to control inoculations with heated toxin—are set out in this report. Demonstrations of the test might readily be given (if they are not given already) at post-graduate courses or during the instruction on infectious diseases which forms part of the curriculum of medical students.

The immunising treatment is obtained by a series of simple inoculations. The necessary toxin-antitoxin mixture (as also the toxin required for the Schick test) is, in New York,

[1] Report on Diphtheria to the Ministry of Health. London: His Majesty's Stationery Office. 1921. 9*d*.

distributed on a large scale from State and other recognised laboratories, the authorities of which guarantee the uniformity of the constituent elements and of the mixture. Corresponding supplies in this country have hitherto been obtainable from the Wellcome Laboratory, and no doubt bacteriologists at other laboratories who are experienced in this type of work can furnish the protective material prepared according to the generally accepted standards. No officially standardised supply is issued by our public authorities.

It is important to note that the constitutional reaction produced by the immunising mixture may exceptionally be somewhat severe, particularly in adults and in those who, in response to the Schick test, show a positive combined with a strong "pseudo" reaction. Dr. Copeman's experience in this matter is referred to on pages 22 and 23 of his report. This consideration, however, need not prevent the use of the immunisation method, especially when regard is had to the much more formidable results of an attack of diphtheria. But, in the adult especially, it is advisable to meet the possibility by commencing inoculation with a minimal dose—say, 0·01 c.cm.—which is unlikely to cause any trouble even in susceptible individuals.

2.—*Customary Methods of Control of Diphtheria.*

Dr. Copeman also makes some observations in his report on the general question of dealing with diphtheria carriers and on other matters which bear on the methods of control of diphtheria which are customary in this country.

This question has recently received much attention from various sides, particularly in consequence of the increased epidemicity of diphtheria in certain districts of England, including London, during the past few years. In connexion with this the medical officers concerned with the matter at the Ministry have had the benefit of frequent exchange of views with medical officers of health, medical officers of infectious diseases hospitals, and bacteriologists, including members of the Committee of the Medical Research Council which is studying bacteriological standards, and a committee of the Epidemiological Section of the Royal Society of Medicine.

In essence, the chief difficulty in the choice of appropriate methods of prevention lies in assessing the infective ability of the different individuals who collectively are classed as "carriers" of the diphtheria bacillus. The fact that this bacillus, when present in the mucous membrane of throat or nose, can be recovered and identified by swabbing and transmitting the swab to the bacteriologist, was established many years ago; first for those suffering from clinical diphtheria, and afterwards for the convalescent and for the healthy person who harbours the bacillus for longer or shorter periods without any ill-results to himself. In its original medical application, and in methods of public health administration based upon it, the simple procedure of swabbing and awaiting a positive or negative opinion from a bacteriologist seemed almost self-sufficient. The bacteriologist's report on the swab determined the diagnosis of the case; persons believed to have been closely in contact with the case were also swabbed; a negative finding would be considered as for practical purposes evidence of absence of danger, while any positive finding demanded all available precautions, time, and patience, until at length one or more reports on subsequent swabs happily proved to be negative.

These earlier and simpler conceptions have now in large measure been abandoned with the growth of knowledge as to the frequency of the carrier condition (in other diseases as well as in diphtheria) and of the very definite distinction which we have now to make between virulent and non-virulent diphtheria bacilli, although these are morphologically and culturally indistinguishable. Moreover, it is generally realised that, in practice, the results of swabbing are materially affected both by the thoroughness of the swabbing itself and by the method of examination and reporting which is followed in the laboratory. In all these circumstances it is important not to attach undue importance to a ritual of routine bacteriological examinations and reports, and not to regard such examinations and reports (as usually obtained in present practice) as the one and only basis of preventive action against diphtheria.

Observations may here be made on the following points, which frequently arise one way or another in practice.

(*a*) *Notifiable Diphtheria.*—The notification of cases of diphtheria under the Infectious Diseases (Notification) Acts should be limited to persons actually suffering from diphtheria—i.e., those exhibiting clinical signs of the disease, with or without bacteriological evidence of the presence of diphtheria bacilli. In the practice of some districts and of many medical practitioners, including, often, the medical officers of hospitals and residential schools, notification is frequently extended to include diphtheria carriers who themselves present no sign of illness. It is doubtful whether this practice is justifiable. Statistically it leads to much confusion; indeed, comparisons between diphtheria notification rates in different areas and in different parts of the country have for some years been rendered very unreliable by reason of uncertainty in this respect. Administratively, the effect may be equally unsatisfactory. The healthy carrier, as a result of his notification as a victim of diphtheria, is frequently removed to hospital where he may stay to the exclusion of persons urgently requiring treatment (a matter of great importance during the stress of an epidemic) and at unnecessary cost to the public authorities. Further inquiry and consideration might have shown that no benefit to the community or to the individual was likely to result from his segregation. A child attending school, for example, who is found to be a carrier, may merely have acquired that condition in common with the majority of the other children in his class at a time when diphtheria infection has been prevalent in the school for many months, and himself have no signs of illness; his bacilli may be non-virulent, and consequently he does not in all probability constitute a danger to others. Non-virulent diphtheria bacilli are not known to be capable of changing into virulent organisms.

It is no doubt of assistance to the medical officer of health, as a guide to preventive measures, to be informed of the result of the swabbing of any person in his district who is suspected to have diphtheria or to be a diphtheria carrier. But as the notification of cases which do not present clinical evidence of diphtheria cannot be required under the Infectious Diseases (Notification) Acts, arrangements should be made to obtain information in regard to such cases without relying upon the machinery of notification. Any local authority may incur necessary expenditure in arranging with practitioners in the district for the supply of such information relating to carriers as may be needed to enable the authority and its officers to carry out their duties under the Public Health Acts.

(*b*) *Antitoxin Treatment.*—Attention should be called to one circumstance in which substantial danger may result from depending too exclusively on bacteriological results. This is the case of antitoxin treatment, which should be begun at once when the clinical evidence of diphtheria is definite. Dr. F. Thomson and other experienced medical officers have recently insisted on the unsatisfactory results of the delay which is caused by the medical attendant having waited for a report on swabs sent to the bacteriologist before administering antitoxin.

(*c*) *Fitness for Discharge from Hospital.*—There is considerable divergence in the practice of different infectious disease hospitals as to the extent to which diphtheria convalescents are bacteriologically examined before being sent to their homes. If abundance of bacteriological assistance were available, including ample opportunities for applying tests for virulence, it would no doubt be desirable to follow a general rule that no case should be discharged until a sufficient number of examinations has been made to establish a very high degree of probability that the convalescent has ceased to harbour diphtheria bacilli; or that, if he is still a carrier, the organisms concerned are non-virulent. In practice, however, these conditions can seldom be realised, and the choice lies between obtaining a much more imperfect degree of information from routine swabbing, without virulence tests, and discharging the ordinary cases, when clinically convalescent, without any appeal to bacteriological findings.

There is little doubt that the necessity for routine bacteriological examinations can be materially lessened by due attention to the re-establishment of normal conditions in the throat and nose before the patient is discharged. The removal of enlarged tonsils, adenoids, &c., has been shown to be of particular importance and to form in itself a powerful method of reducing the numbers of infective carrier cases after diphtheria.

The experience in regard to return cases of certain Metropolitan Asylums Board hospitals in which no routine bacteriological examinations of discharged convalescents are made, seems to show that the return of convalescents to their homes in an infectious condition may be avoided with as much success as that obtained by those hospitals which adopt the rule that two or more negative swabbings must be obtained before the discharge of the patient is permitted.

In general, perhaps, it may be advised that when the bacteriological resources at the disposal of a hospital are limited, they will best be utilised for purposes of diagnosis of doubtful cases, and, with regard to convalescents, for those showing chronic nasal discharge or chronic sore-throat, the nature of which requires special investigation from the carrier point of view. In such instances it is always desirable that the laboratory should be in a position to follow up any positive results by virulence tests. Some recently suggested methods for simplifying these tests are referred to by Dr. Copeman on page 29.

(*d*) *Return of Diphtheria Convalescents to School.*—Somewhat similar considerations here apply. The risk of return of a virulent carrier may be greatly lessened, without recourse to bacteriological tests, by making sure that the convalescent is clinically recovered, is free from nasal discharge, and has

a normal throat. Exceptional instances are on record of healthy persons with apparently normal throats and no nasal discharge acting for long periods of time as carriers, and some degree of security against these rare cases may be obtained by the routine swabbing recommended in the Memorandum on Exclusion from School, 1909, which requires negative reports from three successive swabs taken on separate days as a condition of the return of the child. But even this proceeding cannot be relied upon for the certain and automatic detection of such cases, and, as already indicated, a positive result may only mean the presence of a non-virulent bacillus, which does not justify exclusion from school. In Prussia such considerations as these have led to the arbitrary solution that, for the present, no diphtheria carrier, if otherwise healthy, is to be excluded from school longer than eight weeks after clinical recovery (Ministerial Circular of April 11th, 1921).

(e) *Routine Swabbing in Outbreaks of Diphtheria in Schools and Institutions.*—This practice would seem to be chiefly useful on the first appearance of cases of diphtheria in the school or class. A class, the members of which have been but slightly exposed to an initial infection, may, by means of swabbing, be pronounced with reasonable confidence to be free from carriers. Or the system may succeed in detecting one or more other children whose throats or noses are infected and so lead to their isolation and the clearing of the class, for the time being, from all carriers. At a later stage, however, and particularly in day schools, it would seem that the spread of the carrier condition (as distinct from actual diphtheria) often becomes extensive, and at this stage systematic swabbing, producing large numbers of positive results, affords little guide for useful practical action. Negative bacteriological results in such cases may be consistent with intermittences in a chronic carrier condition. In such circumstances it seems better to concentrate on the clinical condition of the children, and the temporary exclusion from school of those showing signs of chronic sore-throat and nasal discharge, while at the same time using bacteriological methods principally for the determination of the nature of these particular cases. The practice in the London County Council schools has now come to be based largely on these considerations.

Numerous observations are being made on questions such as those on which I have touched. It is to be hoped that, by their active continuance both in the laboratory and in the field, it may before long be possible to obtain scientific authority for something like a definite code for the effective prevention of the spread of diphtheria, such, for example, as we may be said now to possess in the case of enteric fever or small-pox. At the Ministry every effort is being made to follow the development of the subject. Medical officers of health and medical officers of schools and isolation hospitals can, in this connexion, do a specially valuable service if they will communicate to the Ministry, in the form of special reports or otherwise, the results of preventive measures which they test, and the views which they have been able to form in regard either to the extension or to the simplification of the methods of which they have had experience.

MEDICINE AND THE LAW.

Landru.

Henri Désiré Landru has been found guilty at Versailles and sentenced to death for the murder of 10 women and a youth. The jury, who convicted him "without extenuating circumstances," immediately signed a document in his favour. There will be an appeal, and the last has not been heard of a case which has already dragged on for some years.

It was proved as clearly as possible, in the absence of eye-witnesses, that Landru killed his victims at his villa at Gambais, and did away with their remains by burning them in a stove. This rough-and-ready form of cremation owed its success to the house being isolated by a garden, and to the murderer being able to conduct his activities at his leisure. There was, however, the evidence of neighbours as to unusual smoke and odours. Further, the state of the stove, which was new when Landru first occupied his house, indicated that excessive use had been made of it. His counsel's appeal to a higher court on his behalf will probably be based largely upon the non-discovery of ascertainable portions of the bodies of any of the victims named in the indictment. This may have influenced the jury in endorsing the claim for a reprieve, who may also have felt a doubt as to Landru's sanity. As to this, Landru in all reasonable probability would have been convicted in England in far less time than his case has occupied in France, and would not have been found "guilty but insane." In whatever way the gaps in the story of his crimes are filled up, he can hardly be conceived as not knowing the nature and quality of his acts when he committed them, and not knowing that they were wrong.

Some measure of mental abnormality, no doubt, may be assigned as partly responsible for a series of crimes almost without parallel in the records of civilisation. This was evidently the impression conveyed to Sir William Orpen, R.A., whose account of a day in the Versailles court appeared in the *Evening Standard*, with a graphic sketch of the murderer's head. Sir William Orpen writes:—

> "Having seen him I cannot believe that if he murdered those poor people he ever did it in cold blood for the paltry sums of money it has been proved he received from their disappearance or murders. No, it must have been sensual blood lust which caught him at times and made him mad, after which he returned to his normal, kind, contented humdrum life until the madness took him again."

This expression of belief in an impulse beyond the murderer's control is interesting as coming from a layman, but it is subject to the observation that Landru coolly and cunningly provided himself with a series of victims by similar methods in every case, and having found a way of dealing with the bodies which promised immunity from discovery pursued it methodically. In this he resembles the pair of murderers whose names are most familiar to us in this country, and whose case in other respects may be compared with his. With him and with them ultimate discovery was practically certain. He and they persevered until they were caught. The story of Burke and Hare has recently been related here, and in many lay journals, and it forms the latest volume of "Famous British Trials," but the resemblance to Landru's story may be pointed out. Burke and Hare found that Knox, an anatomy teacher, required bodies for his anatomical school and was ready to pay £10 apiece for them and to ask no questions. Dissected bodies could not be reassembled for identification, and there was comparative safety when once they were disposed of. Burke and Hare certainly murdered for profit, and although Landru's booty may not have been large in our eyes, he took care to secure it. Burke and Hare, like Landru, preyed upon a class whose members are apt to disappear without inquiry being made as to their absence. They, however, included men with women among their victims, and lust was not an element in their crimes. Landru's apparent advantage lay in the fact that a woman before going to live with him as his wife or mistress, probably prepared her friends, if she had any, for her prolonged absence, and in outwardly favourable circumstances left a home at some distance before dying in the "accursed villa," as the prosecuting counsel called it. Women who become the mistresses of men of his class, besides being birds of passage, would not correspond with their relatives.

Rex v. *Starkie.*

The Court of Criminal Appeal has dismissed the appeal of Dr. R. W. Starkie against his conviction and sentence at the Central Criminal Court to nine months' imprisonment. The principal ground of the appeal was the trying together upon one indictment the charge of administering drugs with the intent to procure miscarriage, and charges alleging the use of instruments for the same purpose. It was also argued that in his summing up Mr. Justice Acton ought to have directed the jury expressly that in considering their verdict upon the count relating to drugs, they must ignore all evidence given before them on the other charges. Sir Richard Muir replied

on behalf of the Crown to the effect that where it is alleged that an object has been attempted, or carried out, by two different methods, evidence as to both can be given at the same trial. Dr. Starkie's method, he said, was apparently to administer pills first, and, if they failed, to use instruments. The appeal failed, the court holding that the cases relating to drugs and to the use of instruments could be tried at the same time, and that the jury had been properly directed.

Brown v. Craig and Pitcairn.

Mr. J. Gore Brown, whose action against Sir Maurice Craig and Dr. J. J. Pitcairn was tried in May of this year, appealed unsuccessfully for a new trial or for judgment. Mr. J. Gore Brown claimed damages against the two defendants, alleging conspiracy, false imprisonment, and that they had wrongfully certified him as insane. The appeal was dismissed by Lords Justices Bankes, Scrutton, and Atkin, who held that the jury had been properly directed by Mr. Justice Bailhache, and that the only issue raised at the trial was that of a criminal conspiracy by the defendants against the plaintiff. That was the case which the latter had to establish, and his doing so depended chiefly upon the letter alleged by him to have been written by Sir Maurice Craig and denied by the latter. It was argued on behalf of Mr. Brown that there were other matters to which the jury's attention should have been drawn by the judge, but in the opinion of Lord Justice Bankes, who delivered judgment at length, the summing up was fair, sufficient, and satisfactory.

SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

Edinburgh University Chair of Midwifery.

THE University Court of Edinburgh has decided that the teaching of gynæcology is to be combined with the duties of the chair of midwifery. The salary under the new arrangement will be £1200, the professor being allowed to undertake private practice. The curators are to consider on Dec. 16th the names of those qualified for the appointment.

Scottish Voluntary Hospitals.

A report compiled by Sir Napier Burnett shows that there are 94 voluntary hospitals in Scotland with 6981 available beds. Eighteen hospitals have each over 100 beds and account for 4913 beds. Five hospitals, with a total of 2933 beds, are attached to medical schools. The report itself deals with 78 hospitals with 6600 available beds. These hospitals treated during 1920 92,000 in-patients and 310,000 out-patients. The hospitals attached to the medical schools treated altogether nearly 200,000 patients, or approximately 48 per cent. of the total. During the year hospital expenditure was very high, but there is every indication that the present year will show considerable reduction of the cost of many hospital commodities. Good results are anticipated from the committees now being established by the Voluntary Hospitals Commission as regards coördinating and financing hospitals within near distances of each other, and in organising coöperative buying. It is also considered that the adoption of a simplified system of hospital accounts and a uniform financial year would result in considerable benefit.

The demand for beds was greatest in the large hospitals. In those with over 100 beds approximately 92 per cent. were occupied during the year; in intermediate hospitals, with 30 to 99 beds, the figure was 81 per cent., and in hospitals of less than 30 beds 77 per cent. Comparing the non-teaching hospitals with over 100 beds in England and Scotland, there was little difference in the ordinary expenditure per available bed; but in the teaching hospitals there was a remarkable difference; the English group show a deficit of £55 as against £15 per available bed in the case of the Scottish group. Workmen's contributions form a much smaller proportion of hospital income in Scotland than in England. Local Hospital Saturday collections form a rich source of revenue if properly organised, and this method of obtaining funds appealed to an increasingly large number of hospitals during the year. There is a prospect of larger contributions being received in future from the approved societies under the Insurance Acts.

Orphan Homes of Scotland.

Sir Joseph Maclay presided at the annual meeting held at Glasgow of subscribers to the Orphan Homes, the Consumptive Sanatorium, and the Colony for Epileptics at Bridge of Weir. The report contained the record of the fiftieth year's work of the Orphan Homes of Scotland. During the last year the average number of children in the homes was about 1100. During the war many children of soldiers were cared for, but most have been returned to their fathers during the past year. Fifty-one boys had gone to Canada, a country where they had the best chance of making good, and which numbered amongst useful citizens many who had gone from these homes. Fifty-one children had gone to various trades and situations. The healthiness of the homes was remarkable, there having been only four deaths out of the average of 1100 children. In the Consumptive Sanatorium the average number was 152 patients, of whom approximately 50 per cent. were discharged fit to resume ordinary life. In the Colony for Epileptics there were 103 patients.

The Royal Infirmary, Edinburgh.

The third annual meeting of the League of Subscribers to the Edinburgh Royal Infirmary was held on Nov. 29th, when Mr. Paton, the organising secretary, reported that the results attending the organised collections on behalf of the infirmary from public works and business establishments had shown a steady progress, a total of £17,808 having been collected from the various groups of subscribers. The bulk of employees' contributions from the country districts, including those raised by the miners and oil-workers, were reckoned separately from the League funds, and the total raised from these sources would this year be not less than £15,000. In round figures the systematic contributions of organised labour yielded something like £32,000 to the infirmary, which was equal to about one-quarter of the cost of maintenance. The present membership of the League consisted of 989 groups, composed of from thousands to less than a dozen members in different districts. Sheriff Crole, chairman of the board of management, gave some interesting figures concerning the work of the institution. The in-patients for the year numbered 13,600, drawn almost equally from the city and the country, while the out-patients numbered 41,800.

Fourteen years ago the income of the institution was £50,000; now it was over £130,000, but it required great efforts to keep it up to that. The current accounts had not yet been audited, but the income from all sources would show a balance to the good over expenditure. The year's accounts were another triumph for the voluntary system. The total contributions for the year from approved societies amounted to £1709, a disappointing figure, seeing that there were some 200 societies, and nearly 29,000 members had received benefit; yet only 15 societies had given anything out of their surplus to the infirmary. Within the years 1913–18 they had received into the wards 29,000 insured persons, and had treated as out-patients 49,215, and the infirmary had expended upon these in-patients alone over £148,000.

Sheriff Crole recounted work at present being carried out in the infirmary involving capital expenditure. The whole of the heating system was being remodelled at a cost of £15,000. The departments that were being developed were those for X rays and radium, and the bio-chemical laboratory; larger

accommodation for nurses was urgently needed. A trust estate which had been left to accumulate for 14 years was now available for convalescents of the infirmary, the sum amounting to £600,000. The new home would be used for patients who could not walk.

Dec. 5th.

VIENNA.

(FROM OUR OWN CORRESPONDENT.)

A New Biological Station in the Austrian Alps.

A PRIVATE benefactor has enabled the Vienna biological station to establish a new laboratory and organise an up-to-date research station on the Mondsee, a lake near Salzburg. The research station was at first situated in Vienna and later at Trieste, where its chief activity was the study of the fauna and flora of the Adriatic. With the breakdown of the Austrian Empire it was transferred to the Lake of Luntz in Upper Austria, but there the water proved too cold; it had, moreover, to be utilised for the supply of power to factories. On the Mondsee all conditions for continuation of research are to be found; the lake is warm (average temperature about 17° C.) and of great depth (187 metres), containing a large quantity of water, and having a fairly uniform climate. It is conveniently near university cities, being midway between Vienna, Innsbruck, and Munich. It may be recalled that Prof. Steinach's researches on rejuvenation were carried out at the biological station.

Sunshine and Health.

September was the healthiest month on record since the year 1912, owing no doubt to the uninterrupted sunshine experienced for over 250 hours during that period. Nevertheless, the population continued to diminish: the number of deaths was 1937, whilst 1915 living children were born. In July and August there was a small excess of births, but the number of cases of infectious diseases and the general morbidity were higher than in the corresponding period of the previous year. October was also a very healthy month, with a marked absence of all catarrhal conditions, generally prevalent at that time of the year. Sick-clubs and hospitals experienced beneficial effects from the prolonged summer weather; club balance-sheets showed unusually low figures for sick-pay and hospital accommodation of insured members declined. Some improvements were also noted in the health of patients at the children's clinic, at the lupus institute, and in the hospital for war cripples.

Sporotrichosis in Children.

At a recent meeting of the Vienna Medical Society Dr. König exhibited three patients, aged 10, 5, and 7 years, who had long been suffering from pathological conditions diagnosed as tuberculous. The oldest child, a boy, had had a swollen knee-joint for more than a year, had received all the regular treatments, and was able to walk again, but suffered a relapse; several livid-coloured foci in the vicinity of the knee then appeared, and thin discharge from a fistula was noted. In this condition the patient was brought to the clinic where the Pirquet and Wassermann tests proved negative. A diagnosis of tuberculosis was nevertheless made, and by chance, during operation on the joint, there were found a few reddish corpuscles, which on microscopic examination showed distinct sporulation. Thereupon large doses of iodine were given, with very good results. In the other cases, also, a diagnosis of tuberculosis was made elsewhere; there, too, the Wassermann and Pirquet's tests were negative, and the appearance of the affected region—hip-joint—was significant of tuberculous disease. Only after protracted observations was it possible to determine the presence of sporotrichosis. In a third case, a girl of 7 years, who suffered from kerato-conjunctivitis combined with painful inflammatory changes of the hip- and malleolus joint, a diagnosis of tuberculous affection was out of the question. Here again Pirquet's and Wassermann's tests were negative, and antirheumatic treatment was of no use, but iodine proved useful. Dr. König pointed out that a number of similar cases could doubtless be found, where the symptoms were similar to tuberculosis or syphilis but where both tests were negative, so that other ætiological factors must be suspected—sporotrichosis or actinomycosis. In the discussion which ensued, several competent observers agreed that in a number of cases alleged tuberculous disease of joints or bones did not run the accustomed course or respond to routine treatment. In such cases iodides nearly always gave excellent results.

Sixtieth Birthday of Prof. Hayek.

On Nov. 25th Prof. Hayek, the well-known director of the laryngological clinic, received numerous compliments on the occasion of his sixtieth birthday. His former and present assistants and numbers of his pupils assembled at the clinic, together with representatives of learned societies from Germany, Switzerland, Italy, Argentina, Uruguay, and Japan. One of the chief features of the celebration was the presentation to the well-known rhinologist of a remarkable Festschrift, a volume of 800 pages containing 74 original papers on rhinology, collected in honour of Hayek's contributions to professional knowledge. Since Hayek has been at the head of the clinic he has made it a centre of investigation of the physiology of the nose, throat, and trachea. A number of important researches on the pathology of the voice, the radical operations of cancer of the larynx, and the restitution of function of the upper respiratory organs have been originated.

Prolonged Dispute between Sick Clubs and their Physicians and Pharmacists.

For more than a fortnight the doctors of the Krankenkassa—which comprises chiefly factory employees, day-labourers, and artisans—have, after due notice, refused to treat these patients as members of the sick-club, regarding them as private patients, and making the same charges to them as to their regular private patients. The doctors demanded equalisation of their pay with that of other club officials, and upon refusal of their demand declared a medical strike. The pharmacists have also cancelled their arrangements with these clubs, refusing to dispense prescriptions to them at reduced rates. Over 250,000 persons are affected by the strike; the club is bound by law to provide medical help for its members in case of illness, so that the members try to recover the costs of medical attendance from the clubs. The Board of Health is endeavouring to reconcile the three parties: the club doctors have the support of the entire profession, and there is hardly a doubt that they will gain their point. The outcome of the conflict is watched with close interest by the entire profession; success in this connexion will stiffen the resistance of the doctors in the struggle with the Government, which is rendered inevitable by the present trend of legislation. The promises exacted from the Government by the 4-hours strike in the early spring of this year have hitherto remained on paper. Preparations are therefore being made to force the Government to comply with the reasonable demands of the medical profession.

Nov. 25th.

TROPICAL DISEASES LIBRARY. — Since the removal of the Tropical Diseases Bureau to the buildings occupied by the London School of Tropical Medicine the libraries of the two institutions have been united. The common library, which is known as the Tropical Diseases Library, is administered by a committee representing both institutions as well as the Seamen's Hospital Society, who are the trustees. The aim of the Tropical Diseases Library is to promote the study of tropical medicine and hygiene; the library and reading room are open daily from 9 A.M. to 6.30 P.M. (Saturdays 9 A.M. to noon) to all members of the profession who are interested in those subjects.

Correspondence.

"Audi alteram partem."

GENERALIA ON THE LOUSE PROBLEM ON THE WESTERN FRONT.

To the Editor of THE LANCET.

SIR,—Mr. A. D. Peacock's letter appearing in your issue of Nov. 19th in reply to mine which appeared on April 30th hardly disposes of the subject of combating lousiness amongst troops in the field. There is a plain issue between us as to the proved utility of certain types of disinfestor as well as the question of responsibility, and I therefore trust that I may be allowed to state my experience as a sanitary officer for the benefit of others likely at some time or other to be as acutely interested. I have already said that no type of hot-air disinfestor was ever used in the Second Army during the period of my appointment as Sanitary Officer. This circumstance was due entirely to the unreservedly adverse report furnished in the winter of 1916–17 by Mr. Peacock, who, after considerable experimental investigation in the field of certain proposals first communicated to me by Mr. Bacot, entomologist of the Lister Institute, stated that hot-air disinfestation was not only useless but dangerous. I have already cited his reasons in detail. Mr. Peacock now states: "I admit my judgment of 1916–17 was somewhat premature on certain points, but the seriously impairing effect of wet and muddy garments upon hot-air disinfestors still remains a fact (sic)." I want to make it quite plain that during the whole period of my service in forward areas in France, Italy, and North Russia (some five years) I have never once seen a hot-air type of disinfestor in use.

Mr. Peacock's duty in the Second Army was to report, as entomologist, upon the efficiency of various types of disinfestor in use, as well as upon the value of insecticides. The two main methods of disinfestation were steam and the Clayton apparatus (i.e., fumigation by SO_2 and SO_3). Again and again I was assured by Mr. Peacock that he had no fault to find with either of these systems, and therefore his present attitude with regard to the Clayton apparatus is beyond my understanding. I would like to add that in North Russia, on the Murmansk front, where the troops came into close contact with cases of typhus and small-pox amongst the civilian population, we were entirely without disinfesting or disinfecting apparatus of any description. I therefore turned my attention to utilising for this purpose the large chamber of a discarded railway box-wagon to be used as a mobile disinfestation and disinfection chamber in which were hung garments and equipment to be treated. The fumigating gas was obtained by burning sulphur prepared in a special manner to facilitate combustion. The special preparation consisted of sheets of newspaper, cut approximately foolscap size, which had been coated on both sides with a thin layer of sulphur. This was done by momentarily dipping the sheets into a vessel of molten sulphur and hanging them in the air until the film of sulphur had cooled and solidified—a rapid procedure. A number of such prepared sheets was loosely bound together with a few strands of wire to form "brimstone books," which were suspended in mid-air by a wire attached to suitably placed hooks in the roof of the wagon. On the floor, immediately underneath each suspended "book," was placed a tray filled with sand in order to catch such drops of burning brimstone as might be set free and fall. The wagon having been made gas-tight and suitably charged with the material to undergo treatment, a sufficient number of "brimstone books" was suspended and set alight by the operator, who thereupon withdrew and closed all doors, the compartment remaining closed for a period of three to five hours. A similar method of disinfestation was employed for all civilian houses requiring treatment, and in no case did an accident by fire occur nor did a single case of typhus or small-pox arise amongst our troops. The only billets available were the civilian houses, nearly all of which were built of rough logs resting simply on one another, the intervening space being roughly plugged with felt, which formed a natural harbour for lice, bugs, and other "minor horrors." On the principle that "handsome is as handsome does," I think that burning brimstone should be given pride of place in the armamentarium of a sanitary officer, for it was our only help in a critical and lonely situation, and in this connexion I regretted the absence of the Clayton apparatus, which had proved during long years so reliable and dependable in the field in France and Italy and on other fronts as the easiest and readiest means for producing, controlling, and distributing the gases of burning sulphur. If Mr. Peacock "personally wrestled wholeheartedly with the plant on many a day" he shows that he did not know how to handle it, and he therefore failed to get the good results obtained by hundreds of men who handled it properly. I have not seen the manuscript report Mr. Peacock made to the War Office, but surely he did not base his condemnation on the score of expense or the mechanical difficulty he experienced in working the machine; or does he condemn the machine because he now considers the gas is an inefficient insecticide?

With regard to the general question of responsibility for the anti-louse measures taken, Mr. Peacock may be interested to learn that the so-called "louse problem" was recognised even in the early days of the war at the base camps. The first recorded attempt to deal with the matter was made by No. 1 Sanitary Section of the Regular Forces at No. 1 Base at St. Nazaire. By October, 1914—fully a year before Mr. Peacock's attention had been drawn to the matter—an organised scheme of disinfesting and bathing of troops was at work. Use was made of the steam disinfector at the "Service Sanitaire Maritime," augmented by improvised apparatus constructed out of packing cases, oil-drums, and copper tubing. Hot baths were obtained by the use of waterproof sheets, "lessive uses," and tubs procured locally. Some 80 to 100 men and their belongings were dealt with daily, and local requirements were adequately met. It is important to note in this connexion that the men under treatment had arrived from England but a few days previously, and it was already proved at that early stage of the war that the fresh arrivals in France were responsible for the infestation of the camps. Not only was the "louse problem" among troops in camps realised and overcome, but all improvised ambulance trains, contents included, arriving at the base were dealt with by disinfecting squads, as a routine measure, immediately after unloading. The possibility of an outbreak of typhus amongst troops in the forward area was considered both in December, 1914, and January, 1915, when Major-General Sir Robert Porter (Director of Medical Services, Second Army) asked me to prepare a scheme for dealing with disinfestation of troops on a large scale should necessity arise. In the end, arrangements were made to earmark in the neighbourhood of Steenwoorde some 30 agricultural locomotives of a stationary type to be used as steam disinfestors, and, in addition, all hop-oasts (i.e., drying kilns) between Bailleul and Poperinghe, and all chicory kilns in the neighbourhood of Dickebusch, Reninghelst, and Vlamertinghe were similarly ear-marked to be utilised as fumigation chambers.

Lastly, with reference to the method employed officially for ascertaining the extent of lousiness amongst troops (namely, by direct inquiry from officers in medical charge of troops and from officers in charge of medical units receiving sick and wounded men) Mr. Peacock affirms that he can conceive of no method better than his own—"i.e., by doing the job personally and thoroughly from the front line backwards: *living it, not reading it*" (the italics are my own). I would remind him that, although he necessarily had no knowledge of plans and no first-hand knowledge of operations, it was beyond the capacity of any individual

human being (and after all, Mr. Peacock is very human) to furnish the information required. The vast majority of the thousand or more medical officers of the Second Army who were placed in medical charge of troops (and in whose capacity I wish Mr. Peacock could have higher faith) were accustomed to live in intimate contact with their brother combatant officers and shared alike in that intimate knowledge and sense of responsibility for their men which it has always been their pride to maintain.

I am, Sir, yours faithfully,

M. COPLANS.

The Jenner Institute Laboratory, Church-road, Battersea, Nov. 30th, 1921.

FASTING.

To the Editor of THE LANCET.

SIR,—By his interesting and instructive article which appeared in THE LANCET of Dec. 3rd, Sir Henry Lunn has rendered a great service to the profession in redirecting attention to the therapeutic value of fasting. Pray permit me to support his thesis and offer a few comments. When the Allen starvation treatment for diabetes was first introduced, I tried it on several patients in my wards, and was more than satisfied with the results. The first patient, to whom I suggested it in private, was a semitic looking gentleman who claimed an ancient Scottish lineage. He irradiated a characteristic atmosphere of good temper and good living. When I had finished my recital of the benefits of a three days' fast, he became as if deflated: his face assumed a look of horror, and he growled at me, "That's all very fine, doctor, but have you ever tried it?" The retort that I was not a diabetic was obvious and prompt. It was, nevertheless, humiliating to have to confess the negative, and the unpleasant experience determined me never again to be obliged to make a similar reply to what might seem to a layman a perfectly legitimate question. For the next week-end, therefore, I ordained for myself a fast on Allen lines; that is, no food of any kind and only water to drink. Realising the probability and also the inadvisability of hoarding my fæces for the prescribed three days, I took a grain of grey powder on the Friday night and a dose of Epsom salts on the following morning. Then I fasted, secundem artem, until Tuesday morning. On Saturday I felt well, but I am told that my conversation was terse in matter and staccato in manner. On Sunday I felt very well, and endured my trial in the spirit of a Christian martyr. I was resigned. On Monday I felt very well indeed, and did my work at home and at the hospital with zest and vigour. I had arrived at the stage of the superior person who regards meals as mundane matters suitable only to the Philistine and the pork butcher. And truth to tell, I swallowed the cup of tea and the banana which broke my fast on the Tuesday with a certain indefinable regret, as though I had fallen from grace and was no longer worthy to be numbered among the elect.

Since that time, now many years ago, I have frequently repeated the experience, and always with the same result. The first day, craving; the second, resignation; the third, rejoicing and rejuvenescence. The result is that I can cordially recommend the discipline as an occasional exercise to anyone who is obliged to lead a sedentary life. The rationale of its beneficence is probably as follows. In the ordinary routine of town life we do not completely oxidise our intake; there remains a residue which is only partially oxidised. These "suboxides," if I may so term them, are mildly but cumulatively toxic, and give rise to many of the minor maladies and discomforts of everyday life. In the process of fasting these suboxides, which are relatively insoluble, become thoroughly oxidised, and thus fitted for normal and easy excretion.

It is almost certain that the energy which is set apart for our digestive processes takes the path of least resistance. It seizes upon the easily oxidisable, and when that has been disposed of, but not before, it attacks the tougher portion of the proposition. Thus it comes about that the tired horse has the heavier load to pull. Is it any wonder that he falters by the way? The faltering in this case means suboxidation, which can only be corrected by giving an opportunity for an oxidation which is full and free. This is well and physiologically effected by fasting—and by no other means. Sir Henry Lunn says that he sometimes takes cocoa on his days of fast. He will, I am sure, forgive me for saying that, for the reasons given above, he is wrong. Cocoa is more readily oxidisable than, say, urates of soda, and the metabolic energy will naturally seize upon it rather than upon them. The result is a retardation of the curative process. If, instead of a cup of cocoa, Sir Henry Lunn will take half a grain of thyroid, he will expedite his cures and qualify himself to better his present most excellent and timely instruction. I am, Sir, yours faithfully,

LEONARD WILLIAMS.

Harley-street, W., Dec. 4th, 1921.

THE QUESTION OF SELF-DISINFECTION.

To the Editor of THE LANCET.

SIR,—I have read the letter on this topic in your issue of Dec. 3rd with unusual interest, since I have never been quite able to understand why prophylactic measures against venereal disease amongst Canadian troops met with failure, complete and ignominious, whilst identical measures appear elsewhere to have attained considerable success, notably in the Portsmouth area. That "prevention is better than cure" is customarily regarded as axiomatic; and the Canadian military authorities in England attempted with characteristic vigour and thoroughness, through the medium of instructive lectures and the supply to soldiers proceeding on leave of packets and full instructions as to their use, to reduce the incidence of venereal disease. London, being comparatively accessible to troops in Canadian camps, a special treatment centre, suitably disguised, was established here in charge of a competent genito-urinary specialist, and soldiers urged to report immediately after exposure. As no upsetting questions were asked, no record kept of names and numbers, and they were greeted with neither head-wagging, curtain-lectures, nor sermons, the men made full use of the facilities afforded. After confirmation of the use of the materials which had been supplied, an irrigation with potassium permanganate was given, for which later on was substituted the injection into the anterior urethra of a little argyrol solution, the penis having been first clamped near the peno-scrotal junction and then cleansed with sterile water.

I thought very favourably of the scheme indeed, and as officer i/c treatment at the principal V.D. hospital, an institution with 1300 beds and a large out-patient attendance, I followed with great interest the results, supplementing the figures obtained in our admission-room by inquiries along similar lines in the various units through their medical officers. We finally concluded that the net results of the effort were nil: indeed, the advantage at times seemed with the men who had not availed themselves of the facilities; such are the vagaries of statistics, however painstakingly prepared. Our own hospital personnel, numbering 125, and many of them university undergraduates, were under no illusion as to the value of our prophylactic measures, and customarily declined with thanks both the packets and the treatment, preferring to rely on their own individual methods, usually prompt ablution with soap, and urination.

I hold no brief for either of the Venereal Councils competing for a place in the sun, and the literary weapon discharged by the N.C.C.V.D. will, no doubt, draw a return salvo from the N.C.P.V.D. It may be said, however, that the former base their whole campaign on two fundamental conceptions (or misconceptions): firstly, that the public, and especially the young, are ignorant and must be instructed; secondly, that if the possibilities of venereal disease are vividly brought to their notice they will remain

chaste. Some acquaintance with the psychology of youth, particularly in relation to sex matters, leads me to think that both these propositions are untrue. I am tempted to ask the N.C.C.V.D. the following pertinent questions:—

1. Are they quite satisfied that the statistics upon which they base their activities are accurate?

2. Is it not true that the number of "cases" automatically increases as the number of treatment centres is increased; the patients often visiting many centres in turn, so that "one" becomes in completed statistics "six," "ten," or more? We know that with dissatisfied patients this occurs.

3. Do they know that with venereal disease there is often associated a peculiarly characteristic mental depression and a tendency to introspection, due, perhaps, in the first instance to the exaggerated warnings of quacks, but also in some measure attributable to the deductions of the type of scientist who reasons from one to all?

4. Do they admit any connexion between their graphic descriptions of the "horrors" of venereal disease and the present increase in sexual hypochondriasis?

5. Do they not consider that the perusal of certain of their pamphlets may cause unnecessary suffering and anxiety to those unfortunately already infected? Or doesn't it matter?

6. Are they psychologically sound in regarding deviation from virtue as resulting from a calmly considered and rational decision? On the contrary, is it not usually an unreasoning act, the result of an emotional storm?

7. Do they believe their extensive, and expensive, campaign to be justified either by social conditions or, more important, any actual improvement attained?

8. Do they visualise the extent of the disservice their publications are doing and have done to this country abroad, and particularly in the United States?

9. Has the campaign greatly benefited anyone, excluding possibly the manufacturers of expensive "ethical" venereal remedies?

I am, Sir, yours faithfully,

HAROLD D. L. SPENCE, M.D.

Caroline-street, Bedford-square, W.C., Dec. 2nd, 1921.

THE ÆTIOLOGY OF ADENOIDS.

To the Editor of THE LANCET.

SIR,—I do not contend that the food factor is the only factor in the causation of adenoids. All causation is complex, and it is only for practical purposes that we single out one particular factor and speak of it as the cause. If the data I have enumerated in my letter in your issue of Nov. 19th are accurate, it follows as a logical conclusion that the great preponderance of adenoids among British children is related to the peculiar nature of the British diet. The only way Mr. W. Rushton (Dec. 3rd) can cast legitimate doubt on that conclusion is by disproving the accuracy of the data, and this does not seem to me possible. The citation of two or three special cases as proof that I am exaggerating the food factor in the ætiology of adenoids carries little weight. What is needed is to compare, as I have done, the relative frequency of this disease among large numbers of children brought up on British diet with large numbers of children brought up on a non-British diet.

But even the cases cited by Mr. Rushton are not convincing. They do not answer to my conception of properly fed children. The first child was breast-fed for six months only and developed rickets. The other two children were bottle-fed from birth. The fact that all three developed adenoids and tonsils suggests a pronounced catarrhal diathesis in each case, and this again suggests defective intestinal digestion, of which the most common cause in children is improper food. Dr. Sim Wallace, Mr. Rushton tells us, "attributes adenoids to weather conditions." While Dr. Wallace and I are in agreement on many questions, on this point I am reluctantly compelled to differ from him. There is no room for compromise in regard to it. In so far as damp predisposes to catarrh (a bacterially induced inflammation) it may help to produce adenoids; but the average child, if properly fed and enjoying in consequence a sound intestinal digestion, has little tendency to suffer from those catarrhal infections which issue in adenoids. The climate of our country has been damp for thousands of years, but we have the evidence derived from disinterred skulls that it is only within comparatively recent years that adenoid disease has been common in this country. Consider also the fact that, although (strange to say) rickets is almost unknown in Australia among the white children, adenoids is rampant among them. I may add that this disease appears to be equally common among the white children in South Africa. One of the worst cases I have ever seen occurred in a British child who was brought up on the veldt!

Can Mr. Rushton escape from the conclusion to which these facts point?

I am, Sir, yours faithfully,

HARRY CAMPBELL.

Wimpole-street, W., Dec. 3rd, 1921.

PATHOLOGICAL RESEARCH: HUMAN AND COMPARATIVE.

To the Editor of THE LANCET.

SIR,—The science of pathology has made enormous advances during the last two decades, but great indeed as these are, where is the man who will deny that the more he studies and the more he learns, the less he seems to know, ever and anon emphasising the great home truths that a vast realm of unexplored territory awaits the enthusiast for investigation. Even in the field of routine cases which we see in practice daily, where clinical data appear to present themselves in almost standardised sequence, often leave us nonplussed when we take the trouble to verify our conclusions by an autopsy. This is an unsatisfactory state of affairs. In human medicine post-mortem verifications, largely for sentimental reasons, are tabooed, much valuable material being thereby lost to science. Such a plea, however, cannot be put forward by the practitioner of comparative medicine, for here sentiment counts less; nevertheless, the busy veterinary practitioner invariably loses active interest in his case the moment death steps in, simply because he cannot afford the time to make a special visit to the knacker's. What an enormous volume of valuable script is committed thus yearly to oblivion only those who come directly in touch with the subject-matter can realise. Has the time, therefore, not arrived when some scheme could be instituted whereby data and material might be collected at the animal "morgues" distributed throughout the country?—the veterinary surgeon attending selected cases supplying clinical history, &c. Knowledge as to the cause and course of disease in its most diverse form would be tapped to the economic benefit of the human and animal population. By such a scheme at first sight it may be urged comparative pathology would gain much and human pathology little, but in reality this would not be so, for the connecting link between animals and man, from a medical point of view, is very close indeed.

One need only cite experimental research work performed in animals to illustrate the benefit which man derives from comparative pathology. Further, a larger and broader outlook on the field of medicine is required from all of us to-day, and bearing on this point Sir Clifford Allbutt writes:—

"The address you enclose to me contains on every page illustrations of the cross lights which each branch of morbid biology would throw upon the rest. Many little points which to you seem of every-day interest are new to me in this sense, that they illuminate principles which in human medicine are less prominent, in your field they shine out with a new perspective. For instance, you can with every kindliness and caution act at your own discretion unhampered by hesitations coming of the fear and reflections of more

conscious creatures . . . . experiments of a light-bearing kind, you may rightly undertake in the unreflecting animal in the hope of cure which in man cannot be tried without very long periods of tentative proofs . . . . but the large view of the matter is that disease pertains to the whole field of life, animal and plant, and that without the comparative method no science has flourished."

Clearly, then, the obvious course seems to be that human and comparative pathological research should be more closely linked together in the future than they have hitherto been in the past.

I am, Sir, yours faithfully,
W. M. SCOTT, F.R.C.V.S.

Bridgwater, Dec. 3rd, 1921.

BLOOD-DONORS.

To the Editor of THE LANCET.

SIR,—The annotation in your issue of Nov. 26th on the question of blood-donors may tend to bring the subject into that prominence which is at present lacking in this country. I am in cordial agreement with the writers in the *Guy's Hospital Gazette* and *St. Bartholomew's Hospital Journal* and would deprecate the use of the medical student's blood for purposes of transfusion. Up to the present one has usually depended on some relative of the patient to provide the necessary blood in an emergency, but occasions must arise when such will not be available. Last year, in order to meet this difficulty, I examined and classified the blood of a large number of the Sheffield constables, thinking that they were a healthy body of men and easily procurable in a sudden emergency, but unfortunately, after the classification was completed, the Sheffield Watch Committee refused to allow me to utilise the blood of volunteers from their men. I have recently applied to the manager of the tramways for similar facilities, expecting a like answer, as there are obvious objections to the use of men on public duty. I think it would be of advantage if donors could be selected from the general population by some carefully worded advertisement asking for volunteers, each volunteer to receive a small fee for submitting to grouping tests, and, in the event of his blood being used, a fee of at least five guineas.—I am, Sir, yours faithfully,

Sheffield, Dec. 1st, 1921. E. F. SKINNER.

OCCUPATIONAL THERAPY IN HEART DISEASE.

To the Editor of THE LANCET.

SIR,—I was much interested in your annotation on physical exercises in the treatment of heart disease in the issue of Nov. 5th; also in the letter of Dr. I. Harris on the 26th, both referring to my communication of Oct. 22nd. In neither comment, however, was the essential part of my letter discussed, the remarks being confined to the general question of the value of exercises in the treatment of heart disease. The point I desired to emphasise was the humanitarian and economic importance of looking upon the beneficial effects of physical exercises, not as an end in itself, but as means for the acquisition of a capacity for work in a line compatible with the patient's physical powers, always keeping in view his adaptability to a change of occupation. To achieve this, patients should be carefully graded and training begun at an early period of convalescence; such training should be specially directed towards preparation for the kind of work appropriate to each case subject to modification where necessary. I have pointed out the unsatisfactory results which follow the return of a patient convalescent from an attack of heart failure to an occupation which had abundantly manifested its unsuitability. In this connexion a quotation from a pamphlet, entitled "Sanatoria for Cardiacs," issued by the Association for the Prevention and Relief of Heart Disease, N.Y.:—

"The value of sanatorium treatment of convalescent cardiacs has passed the experimental stage. Experiences with selected groups of children and young adults have shown the tremendous value of institutional treatment in securing a degree of recovery which affords them the opportunity for useful lives and self support. The results obtained by the Burke Foundation, which has cared for over 2000 selected cases in the past six years, are most convincing. Of 130 boys between 10 and 16 years of age received during the first two years and carefully followed, 85 per cent. have remained steadily at work or at school since leaving the institution. The results obtained in adults and more advanced conditions are less striking, but the economic advantage of rendering a large proportion of these sufferers self-supporting and no longer a financial burden to the community, as well as the humanitarian motive of prolonging life and assuaging suffering, should make an urgent appeal to both our pockets and our sympathies."

In another pamphlet from the same source on Occupation for Cardiacs occur remarks under the following headings: Danger from Overstrain, Choosing a Job, General Housework, Skilled Employments, Employer's Coöperation, Change of Occupation. With regard to the latter, the important point in making a selection is that the new job should demand as little physical exertion as possible. The writer of this pamphlet concludes: "There are but few cardiacs who cannot do something to earn a living, and many of them can earn as good wages as if they had no disease whatever."

That the subject of heart disease, its prevention and treatment—including occupational therapy—is being systematically studied in America medical literature bears ample proof. The question is, Are we in this country doing our share in the practical application of the knowledge we possess?

I am, Sir, yours faithfully,
CHARLES W. CHAPMAN.

Harley-street, W., Nov. 30th, 1921.

THE SUSSEX PROVIDENT SCHEME: FIRST YEAR'S WORKING.

To the Editor of THE LANCET.

SIR,—In view of the fact that some doubts have been expressed as to the economic soundness and financial stability of the Sussex Provident Scheme, it may interest some of your readers to hear the results of the first 11 months' working. It was decided to make the first financial year one of 11 months in order that the associated hospitals might receive what was owing to them before the last quarter day of the current year. The financial arrangement which was agreed to when the scheme was initiated was that, for the first year, the income of the scheme should be divided into 40 parts and that these should be allotted beforehand to the associated hospitals, in a varying proportion based upon the work which each might be expected to do. This was, of course, a purely experimental arrangement and subject to being changed in the light of the first year's experience, but the results which have been attained will be of value in the future whether the scheme maintains its existence or not.

One satisfactory result is that, although some hospitals have been favoured more than others, they have all been paid in full for the cost of the services which they have rendered to the members of the scheme during the year; but beyond this 100 per cent., the percentage of payment to the cost of the work done varies very considerably. One hospital which, so far as can be ascertained, has not been called upon for any service to the members of the scheme has been paid one-twentieth of the total income, and of the others the percentage varies from 105 at the Brighton, Hove, and Preston Dispensary, to 307 at the Sussex Throat and Ear Hospital. At the New Sussex Hospital for Women and Children and the Stephen Ralli Memorial Laboratory it reaches 168, while at the Royal Sussex County Hospital it amounts to 117·5. The Dental Hospital has been paid at the rate of 15*s.* 4*d.* a visit. The visiting consultants have been paid a fee of £3 3*s.* for each consultation, while one-eighth of the total income still remains in

hand. The percentage of members who are recorded as having received in-patient treatment during the 11 months is 2·083, and the percentage of those recorded as having received out-patient treatment (including dental, massage, and X ray cases) is 8·5.

Although no definite conclusion can be drawn from these figures they are suggestive and encouraging. The number of members of the scheme is still small, and for a large proportion of them the services will be available without further payment during part of next year. On the other hand, as the scheme is becoming more generally known the number of new members joining every month is showing a steady increase, and if this should continue there cannot be a doubt that the success of this year will be repeated and increased in the future.

I am, Sir, yours faithfully,

SELBY,
Hon. Sec., Sussex Provident Scheme for Hospital
Dec. 5th, 1921. and Specialised Medical Services.

The Services.

ROYAL NAVAL MEDICAL SERVICES.

Surgn. Lieut. L. W. Gemmell to be Surgn. Lieut.-Cmdr.

ROYAL ARMY MEDICAL CORPS.

Capt. J. A. W. Ebden, from Res. of Off., R.A.M.C., to be Capt.

The undermentioned Lts. (temp. Capts.) to be Capts: J. D'Arcy Champney, V. J. Perez.

Temp. Capt. (actg. Lt.-Col.) G. Clarke relinquishes his commn. and is granted the rank of Lt.-Col.

R. W. Shaw to be temp. Lt.

ARMY DENTAL CORPS.

Lt. (temp. Capt.) B. W. Tyson to be Capt.

SPECIAL RESERVE OF OFFICERS.

The undermentioned relinquish their commns.: Maj. J. M. Darling (retains the rank of Maj.), and Capts. H. W. Hills (granted the rank of Maj.), J. R. Crolius (on appt. to a commn. in the R.A.F.), and H. F. Vellacott (retains the rank of Capt.).

TERRITORIAL ARMY.

Capt. J. D. Fiddes to be Maj.

Capt. R. V. Favell and is granted the rank of Maj.

Capt. J. R. Griffith (late R.A.M.C.) to be Capt.

Capts. A. R. Grant and N. G. H. Salmon resign their commns. and retain the rank of Capt.

Lt.-Col. C. Graham-Grant, having attained the age limit, is retired and retains the rank of Lt.-Col., with permission to wear the prescribed uniform.

Maj. J. E. Bates, having attained the age limit, is retired and is granted the rank of Lt.-Col., with permission to wear the prescribed uniform.

Maj. A. F. Rutherford, having attained the age limit, is retired and retains the rank of Maj., with permission to wear the prescribed uniform.

Capt. P. H. Mitchiner is restored to the estbt.

The undermentioned officers relinquish their commns. and retain their rank: Majs. J. Allan, W. Y. Martin, F. B. Jefferiss, and R. Thornton (with permission to wear the prescribed uniform); and Capts. D. R. Harris, W. J. H. Davis, and J. Cook.

1st Lond. (C. of L.) Genl. Hosp.—Lt.-Col. (Bt.-Col.) H. J. Waring resigns his commn. and retains his rank.

4th Lond. Genl. Hosp.—Capt. C. Ogle, having attained the age limit, is retired and retains the rank of Capt.

TERRITORIAL ARMY RESERVE.

Col. W. Ranson, from Genl. List, to be Col.

Lt.-Col. A. E. Kidd, from 1st Casualty Clearing Station, to be Lt.-Col.

Capt. A. Ramsbottom, from Genl. List, to be Lt.-Col.

Capt. J. F. Ward, from R.A.M.C., Genl. List, to be Capt.

Maj. J. Nightingale, having attained the age limit, is retired and is granted the rank of Lt.-Col., with permission to wear the prescribed uniform.

ROYAL AIR FORCE.

T. J. D. Atteridge is granted a short service commission as a Flying Officer.

Lt. (temp. Capt.) G. W. Allen, Army Dental Corps, is granted a temporary commission as a Flight Lt. while attached for Royal Air Force duty.

Obituary.

THOMAS GAMBIER, M.D. ST. AND.

THE history of the Eversfield Chest Hospital at St. Leonards is to a great extent the history also of the life of its founder, Dr. Thomas Gambier, whose death occurred on Nov. 27th in his eighty-fifth year.

The third son of George Gambier, of Canterbury, he was at the youthful age of 15 articled to a country surgeon, and then held posts as assistant house surgeon and dispenser at the Kent and Canterbury Hospital. In October, 1858, he entered the Middlesex Hospital, where he gained three years later one of the resident appointments in competitive examination. During his studentship young Gambier took an active part in the resuscitation of the Medical Society attached to the hospital, becoming its secretary and later a vice-president. In 1863 he embarked upon private practice at Okehampton, where he was appointed Poor-law officer and public vaccinator. In 1880 he became clinical assistant at the Throat Hospital, Golden-square, casualty surgeon on the L. & N.W.R., and surgeon-in-charge of the men engaged in boring the Primrose Hill tunnel.

During the early years of his career Dr. Gambier lost a brother and sister from tuberculosis, and it was this domestic sorrow which caused him to devote most of his life to the study of this disease. In 1882, after moving to St. Leonards, he opened at No. 6, Trinity-street, Hastings, a small dispensary for diseases of the throat and ear. Patients were numerous and larger premises were soon needed. While negotiating for a larger hospital, Gambier received, through a moribund patient, a letter from Mr. Samuel-Morley, M.P., enclosing a cheque for £20, and she asked that a notice of the gift should be sent to the *Hastings Observer* before she died. The immediate outcome was the raising of a sum of money sufficient to buy the large semi-detached house at Maze Hill, St. Leonards, which was opened in 1884 as the Friedenfels Home. The next stage was the offer, by the late Mr. C. G. Eversfield, of a piece of land on an ideal site at St. Leonards, on which, in 1891, the present Eversfield Chest Hospital was opened. Of this hospital Dr. Gambier was honorary physician and resident medical superintendent until the day of his death, his unceasing labours being recognised by his old friends and patients in 1907, when a life-size portrait by Mr. L. Carr Cox was presented to him.

Dr. Gambier was descended from an old Huguenot family, former members of which left Normandy on the revocation of the edict of Nantes, and he was himself a fellow of the Huguenot Society of London. He leaves a widow who, as secretary of the hospital, rendered him every assistance in his work.

WILLIAM HENRY HADEN-HADEN, M.D. ST. AND., M.A., D.C.L., M.R.C.S.

Dr. Haden-Haden died on Nov. 20th at the age of 90, and according to his oft-repeated injunction to his friends, his body was cremated. He received his medical education at Guy's Hospital, and at Edinburgh, Cambridge, and Vienna, qualifying, in 1857, with the M.R.C.S. Eng. and graduating M.D. at St. Andrews University in the same year. Dr. Haden-Haden held the appointments of clinical assistant and prosector of anatomy at Guy's Hospital, and was subsequently externe at the Hôtel Dieu and Hôpital des Enfants, Paris, and interne at the Hôpital Lourcine. Later he became hon. physician to the South Dispensary, Liverpool. He was a Fellow of the Medical Society of London, an associate of the Société de Biologie and the Société d'Anatomie de Paris, a member of the Psychological Society of Vienna, and of the General Council of the University of St. Andrews. Though Dr. Haden-Haden confined

his advocacy of the practice of cremation chiefly to persuasive conversations with his personal friends, he was keenly interested in the adoption of this as a hygienic method of disposal of the dead. He was the author of many well-written papers on widely different subjects, ranging from reflections on The Antiquity of the Globe and on The Principles of Organology to contributions to the therapeutics of variola, chronic gastric catarrh, and typhoid fever. A man of wide general culture, his experience of continental as well as British methods of diagnosis and treatment of disease gave him a well-deserved reputation as a wise physician.

WILLIAM GORDON WOODROW SANDERS, M.D. MONTPELLIER, F.R.C.P. EDIN.

THE death of Dr. Gordon Sanders in early middle life has removed one of the best known British practitioners on the French Riviera. Dr. Sanders came of a medical family. His grandfather practised in Edinburgh; his father was professor of pathology in the University. He graduated there himself in 1889, with first-class honours, becoming clinical tutor in the medical wards of the Royal Infirmary. After a brief attempt to carry on the family tradition in the city of his upbringing he was obliged by ill-health to go abroad. A few months' residence at the University of Montpellier procured for him the doctorate, and therewith the right to practise on French soil, and he spent the remainder of his life at the delightful and important climatic station which Lord Brougham made famous in the early 'forties. With native ability and zeal for work, combined with an intuitive instinct as a clinician, Dr. Sanders made a large circle of friends among the patients who return to Cannes year after year to avoid the Northern winter.

While still at Edinburgh Dr. Sanders presided for some years over the Medical Society, and his personal interest in cardiac pathology resulted in a series of papers dealing with malformations of the heart and cardio-pulmonary murmurs. Since 1894 he had been a Fellow of the Royal College of Physicians of Edinburgh. Abroad he was an active member of the Continental Anglo-American Medical Society.

THE LATE PROF. PETER THOMPSON.

LAST week we gave a brief record of Prof. Thompson's life-work, largely from the administrative standpoint. His fellow anatomist, Prof. James C. Brash of Birmingham, writes of him from two other points of view.

"Prof. Thompson was great as a teacher and great as an investigator. Into his teaching work he poured the energetic enthusiasm which was a leading feature of his character, and dull must he have been who could not respond to such a stimulus. He was at his best in his devotion to the exposition of what he always thought and spoke of as the wondrous tale of development, and in this connexion it has been said of Prof. Thompson (a new version of the stock phrase, in praise of the anatomical lecturer, about making the 'dry bones live') that he made for his students out of a difficult subject a fascinating fairy-tale.

"His original work falls naturally into two periods, separated from each other by the date of his appointment to the King's College chair. The first of these periods was morphological, the second embryological, and in both he did outstanding work. His work on the muscles of the pelvis is well known, and apart from its comparative value has passed into standard description. 'The Myology of the Pelvic Floor,' presented as an M.D. thesis, was a model of descriptive writing, expanded later in a series of papers, and finally summed up in an article on 'The Structures of the Pelvic Outlet' in the fourth edition of Morris's Treatise on Anatomy. The turning-point of his career as an investigator came in the summer of 1906 when, working under Profs. Wiedersheim and Keibel at Freiburg, he became practically acquainted with modern methods of embryological work. His work on a human embryo 2·5 mm. long from the collection of Dr. Robert Meyer in Berlin resulted in the well-known paper in the *Journal of Anatomy and Physiology* in 1907, 'Description of a Human Embryo of Twenty-three Paired Somites,' beautifully illustrated by drawings provided by his wife. He had constructed a model of the embryo. This was his introduction to the wax-plate method of which he became an enthusiastic exponent, and to his advocacy of which may be traced a good deal of subsequent work in this country.

"It remains to note some special features of Prof. Thompson's work during his Birmingham period. Soon after his appointment he delivered two special post-graduate lectures on 'Some Early Human Embryos' to large and appreciative audiences. In 1910 his Arris and Gale lectures on 'Some Embryological Problems in Relation to Medicine,' published in THE LANCET, dealt with many points of practical interest in the development of the thyroid, the lung buds, the liver, and the heart. In 1915 he enhanced the reputation of his department by bringing to fruition an illustrated volume, published by the University Council, of 'Studies in Anatomy,' his own contribution being a valuable study of a 7 mm. human embryo."

Prof. Brash gives many further evidences of his colleague's devotion to his task. Up to the time of his death Thompson continued to work, as his health allowed him, at a paper describing an early human ovum mentioned in his Ingleby Lectures of 1918. Such in brief outline, Prof. Brash adds, was the career of one who, stricken in his prime, had yet accomplished much, and whose loss is a hard blow to his friends and to the University which he adorned.

Medical News.

UNIVERSITY OF OXFORD.—The following degree has been conferred:—

M.D.—W. H. Butcher, St. John's.

UNIVERSITY OF CAMBRIDGE.—The following degrees have been conferred:—

M.D.—C. J. Stocker, Trinity.

M.B. and B.Ch.—F. P. N. Parsons, Pembroke; R. S. Scott, Caius; G. W. Theobald, Emmanuel.

M.B.—J. M. Higgington, St. John's; R. B. P. Lansdown, Pembroke; G. P. N. Richardson, Christ's.

SOCIETY OF APOTHECARIES OF LONDON.—At examinations held recently the following candidates passed in the subjects indicated:—

Surgery.—H. Amin, Guy's Hosp.; J. L. Delicati, Bristol; E. D. Foster and J. S. Lewis, St. Mary's Hosp; and J. A. Marriott, Manchester.

Medicine.—A. G. L. Brown, Westminster Hosp.; S. Cohney, Sydney and London Hosp.; W. E. F. Davidson, St. George's Hosp.; M. T. A. Elnakeeb, Cairo; R. Erskine-Gray, Charing Cross Hosp.; E. D. Foster, St. Mary's Hosp.; S. A. Hayes, Kingston, Ontario; R. Henein, Manchester; M. Hilmy Eid, Cairo and Guy's Hosp.; C. F. Long, Bristol; D. Menzies and A. Mishriky, St. Mary's Hosp.; S. Sedaros, Cairo and Guy's Hosp.; L. Spira, Vienna; and R. S. Thomas, Charing Cross Hosp.

Forensic Medicine.—A. G. L. Brown, Westminster Hosp.; M. T. A. Elnakeeb, Cairo; E. D. Foster, St. Mary's Hosp.; R. Henein, Manchester; C. F. Long, Bristol; C. Martiny, Copenhagen; L. Spira, Vienna; and H. M. White, Leeds.

Midwifery.—J. I. Cahill, Middlesex Hosp.; A. G. L. Davidson, St. George's Hosp.; M. T. A. Elnakeeb, Cairo; E. D. Foster and A. Mishriky, St. Mary's Hosp.; and C. A. Nicholl, London Hosp.

The Diploma of the Society was granted to the following candidates entitling them to practise medicine, surgery, and midwifery: W. E. F. Davidson, J. L. Delicati, E. D. Foster, R. Henein, M. Hilmy Eid, C. F. Long, and D. Menzies.

HISTORY OF MEDICINE: THIRD INTERNATIONAL CONGRESS.—This congress will be held in London, under the presidency of Sir Norman Moore, from July 17th to 22nd, 1922. Meetings will be held at the Royal Society of Medicine, the Royal College of Physicians, the Royal College of Surgeons; also at the Wellcome Historical Museum, where there will be an exhibition of objects connected with the history of medicine, surgery and the allied sciences, including ancient manuscripts, early printed books, pictures, sculptures and engravings, ancient surgical instruments, medals, and so forth. The subjects suggested for discussion by the International Society of the History of Medicine are: (1) The principal seats of epidemic and endemic disease in the Middle Ages, including plague, gangrenous ergotism, leprosy, and malaria; (2) the history of anatomy. Further information may be obtained from the general secretary, Dr. J. D. Rolleston, 21, Alexandra Mansions, King's-road, London, S.W. 3.

THE Bradshaw Lecture of the Royal College of Surgeons of England will be delivered by Mr. H. J. Waring, on Wednesday, Dec. 14th, at 5 P.M., on the Operative Treatment of Malignant Disease: its Possibilities and Limitations.

ROYAL HANTS COUNTY HOSPITAL.—At the quarterly court of governors of the Royal Hants County Hospital, Winchester, it was reported that last year nearly £1000 was raised by the weekly insurance scheme, which was meeting with great success. It was stated that the re-modelling of the X ray department was in hand at a cost of £1000.

WEST KENT MEDICO-CHIRURGICAL SOCIETY.—A meeting will be held at the Miller Hospital, Greenwich, to-day, Friday, Dec. 9th, at 8.45 P.M., with Dr. C. T. T. Comber, the President, in the chair, when the Purvis Oration will be delivered by Sir James Purves Stewart on Respiratory Disorders of Nervous Origin.

UNIVERSITY OF BRISTOL.—Sir Isambard Owen having retired from the Vice-Chancellorship of the University, an office of which he was the first occupant, the Court of the University has conferred on him the title of Honorary Fellow. He is succeeded as Vice-Chancellor by Principal Loveday, of Hartley University College, Southampton.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.—A meeting of this society will be held at 17, Bloomsbury-square, London, W.C., on Dec. 14th, at 8 P.M., when Prof. H. G. Greenish and Miss C. E. Pearson will present a communication from the Research Laboratory of the Society on Volatile Oils in Pills, and Mr. T. E. Wallis, lecturer in botany, will discuss Moths (Corcyra, Ephestia, and Borkhausenia) as Pests. The meeting will be social as well as scientific in character, and medical friends of members are cordially invited.

PANEL COMMITTEE FOR THE COUNTY OF LONDON.—The second annual local medical and panel committee dinner and dance will be held at the Holborn Restaurant on Thursday, Dec. 15th, at 7 P.M. Mr. R. W. Harris, Dr. Smith-Whitaker and Sir Thomas Neill, J.P., will be guests of the evening and will speak. All practitioners whether on the panel or not will be welcomed. Tickets (gentlemen 21s., ladies 15s., exclusive of wine) may be obtained from the Secretary, Mr. Robert J. Farman, Staple House, 51, Chancery-lane, London, W.C. 2.

BRISTOL MEDICAL SCHOOL: ANNUAL DINNER.—The annual dinner of the Bristol Medical School was held on Nov. 28th, Mr. W. R. Ackland presiding. The health of Sir Henry Gray, the guest of the evening, was proposed by Dr. R. C. Clarke, who alluded to the value of the services rendered by him to the armies in France. In his reply Sir Henry Gray drew attention to certain similarities between the Aberdeen and Bristol schools of medicine, and paid a tribute to the practical and thorough spirit shown of the Bristol men whose work he had seen in France. The dinner was preceded by the Long Fox lecture on the Repair of Bone Injuries, by Mr. E. W. Hey Groves.

LONDON (R.F.H.) SCHOOL OF MEDICINE FOR WOMEN DINNER.—A successful function, at which about 250 past students, students, and guests assembled, was held at the Connaught Rooms, Great Queen-street, London, W.C., on Dec. 2nd. Mr. James Berry presided, and in a speech, which reflected his pride in and affection for a medical school which he had done so much to develop, proposed the toast of the Royal Free Hospital and the London School of Medicine for Women. Mr. Berry congratulated the authorities on the establishment of the first clinical unit in obstetrics and gynæcology. This had been made possible by the generosity of Lady Barrett, who, though unable to spare the time from her consulting practice to undertake the duties of director, had relinquished her beds in the hospital to Prof. Louise McIlroy. He spoke of the examination successes of the past year, two old students having become F.R.C.S., and one having gained the gold medal in the M.B., B.S. Lond.; and urged the resumption of two characteristic features of the Royal Free Hospital teaching which had lapsed during the war—consultation over cases and an annual exhibition of museum specimens. In welcoming the new members recently appointed to the honorary staff of the hospital, Mr. Berry emphasised the importance of research as well as good routine work among the duties owed to a hospital by its staff. The toast of the guests of the evening was proposed by Dr. Haldin Davis, and that of the chairman by Mrs. Lucas Keene, both in happy anecdotal vein. Sir Arthur Keith responded for the guests and Mr. Berry for himself. An excellent feature of this dinner was the limitation in number and length of the speeches in order to leave time after the formal proceedings for old friendships to be renewed.

CIVIC EDUCATION LEAGUE.—A lecture will be given on Thursday, Dec. 15th, at 8.15 P.M., at Leplay House, 65, Belgrave-road, S.W. 1, by Dr. C. W. Saleeby, entitled Light Against Death. The chair will be taken by Dr. Gladys Miall Smith. Admission will be free.

Dr. C. W. Paget Moffatt has been appointed medical officer of health for Bolton.

SMALL-POX IN COLNE VALLEY.—Five cases of small-pox have been notified to the Marsden Urban Council during November. Altogether about 50 cases have been notified in the Colne Valley recently.

DONATIONS AND BEQUESTS.—The Board of Management of the Royal Infirmary, Manchester, has received from Messrs. Peel and Co. £750 for increase of endowment of a bed, from Mr. and Mrs. George Bolton Stott £125 10s. for purchase of an operating table, and over £350 from various commercial firms and other donors.

NORTH-WESTERN TUBERCULOSIS SOCIETY.—A meeting of this society will be held at the Public Health Laboratory, York-place, Manchester, on Thursday, Dec. 15th, at 3 P.M., when Dr. Arthur Sellers will read a paper on Complement-Fixation Tests in the Diagnosis of Tuberculous Infections. Any medical practitioner interested in tuberculosis is invited to attend.

VOLUNTARY HOSPITALS AND THE MINISTRY OF HEALTH.—In a long letter to the *Times* of Dec. 7th Sir Alfred Mond justifies the policy of the Government in asking voluntary hospitals to coöperate in raising fresh revenue. Unconditional deficiency grants would, he says, have been a sure way of relaxing voluntary effort. He announces a considerable amount of "new money" in sight; at least £100,000 a year is expected from the approved societies, and other schemes for London are being developed by the King's Fund. The Minister of Health states advisedly that what has been done should be adequate, if the community also plays its part, to save the voluntary system.

A POST-GRADUATE COURSE IN LONDON.—The Fellowship of Medicine and Post-Graduate Medical Association, with the coöperation of various special hospitals, is arranging to hold in the metropolis a series of special courses in general and special subjects during the forthcoming year. These will begin with a six weeks' post-graduate course in medicine from Jan. 9th to Feb. 18th, 1922, when both morning and afternoon sessions will be held at various special hospitals. This has already been announced in our columns, and the titles of the subjects to be dealt with by the various lecturers will be published shortly. The fee for the course will be 15 guineas, and as the numbers attending will be limited to 20, early application should be made to the Secretaries of the Fellowship, 1, Wimpole-street, London, W.1.

PADDINGTON INFIRMARY: OPENING OF NURSES' HOME.—On Dec. 5th Lord Onslow formally opened a new nurses' home and spacious operating theatre at the infirmary in Harrow-road. Before the ceremony, Mr. H. A. Baker, Chairman of the Board of Guardians, outlined the development of the existing infirmary from an old-fashioned Poor-law workhouse and infirmary of ten years ago into a modern well-equipped hospital, wherein 218 serious operations were performed and 1000 X ray examinations made last year. Lord Onslow, in declaring the buildings open, laid particular stress on the value to all concerned of the coöperation between infirmaries and voluntary hospitals, such as existed between this infirmary and St. Mary's Hospital. He congratulated the nursing profession in general on the adoption of shorter hours for nurses, expressing his firm belief in the benefit to patients as well as to nurses resulting from less fatiguing conditions of work for the latter. Mr. L. V. Lester-Garland, Chairman of the Building Committee, gave details of the construction of the new buildings and incidentally described a deputation to the Ministry of Health when the proposals were first considered. He said that this department, like other Government departments, was imbued with much caution and had refused to commit to paper any statements of approval except to promise that the Ministry of Health would "take an intelligent interest" in the scheme. A vote of thanks was proposed to Lord Onslow by Mrs. H. Jones, Chairman of the Infirmary Committee, and seconded by Mr. W. Day, Vice-Chairman of the Finance Committee. The buildings, designed by Mr. Percy Adams, F.R.I.B.A., were open for general inspection, the operating theatre being a special feature of the up-to-date equipment. A large communicating corridor has also been erected connecting the central building to the kitchen and other blocks. The speakers were unanimous in their appreciation of the energetic and untiring action of Dr. A. G. Stewart, the medical superintendent of the infirmary, in promoting the rapid development of these valuable additions to the infirmary.

ROYAL NORTHERN HOSPITAL. — The Great Northern Central Hospital, Holloway, will henceforth be known as the Royal Northern Hospital.

SANATORIUM BENEFIT IN MANCHESTER. — An elaborate report has been issued by the Sanatorium Benefit Sub-Committee of the Manchester Insurance Committee dealing with the period from July, 1912, to the end of April, 1921, when the work was passed over to the Manchester Corporation. Three hundred beds were secured in sanatoriums and other institutions, and a special tuberculosis dispensary service was set up in the city capable of dealing with 1248 persons weekly. During the period included in the report, 8139 applications were received from insured persons eligible for sanatorium treatment—5690 from men and 2449 from women. A table of age-groups shows that between the ages of 16 and 50 the number of applications from men remained fairly constant; the greatest number from women was between the ages of 16 and 21, most probably because many women ceased to insure on becoming married. Statistics show that the cases from the several wards of the city were most numerous from the poorer and more congested areas—the percentage varying from 0·45 to 2·06—the average percentage over the whole city being 1·14. Of 5690 men treated, 770 showed no signs of active tuberculosis, and of 2449 women, 445 gave similar records. Emphasis is laid on the importance of early notification of the disease; applications for sanatorium benefit have in the past been received from persons who died a few days afterwards. A considerable number of patients left the various institutions before the termination of their period of treatment or declined an extension of this period, and most of these self-discharges seemed to be due to domestic circumstances; for the same reason some patients found it impossible to enter an institution for treatment. The committee express the view that "their work has largely contributed to the progress made in Manchester in the treatment of this disease." Dr. D. P. Sutherland, senior tuberculosis officer of the committee, adds that during the period of sanatorium benefit the death-rate from pulmonary tuberculosis fell from 1·53 to 1·10, and associated with this fall there was an increased survival rate of infected notified cases. Of undoubted sputum-positive cases of tuberculosis during 1913–17, 67 per cent. were known to be living at the end of 1919. For sputum-negative cases for the same period the figure was 82 per cent.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole street, W.

MEETINGS OF SECTIONS.

Monday, Dec. 12th.

WAR: at 5.30 P.M.
Paper:
Colonel H. W. Grattan: Medical Organisation, with Special Reference to the Transport of Wounded in Open Warfare.

Tuesday, Dec. 13th.

THERAPEUTICS AND PHARMACOLOGY: at 4.30 P.M.
Paper:
Dr. H. W. Vines: The Parathyroid Gland in Relation to Calcium Metabolism.

Wednesday, Dec. 14th.

PSYCHIATRY: at 5.30 P.M.
Paper:
Dr. T. A. Ross: Some Points about Repression.

Thursday, Dec. 15th.

DERMATOLOGY: at 5 P.M. (Cases at 4.30 P.M.)
Cases. The following will be shown by:
Dr. George Pernet: (1) Morphœa Facici. (2) Parakeratosis Variegata.
Other cases will be shown.
Paper:
Major A. E. Milner: Diathermy in the Treatment of Lupus Erythematosus.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W.
MONDAY, Dec. 12th.—8.30 P.M., Paper by Dr. Aldo Castellani on Hæmorrhagic Bronchitis of Non-Tubercular Origin.—Demonstration by Dr. J. S. Owens on Dust in Expired Air.

THE ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 11, Chandos-street, Cavendish-square, W.
THURSDAY, Dec. 15th.—7.15 P.M., Demonstration by Dr. A. Balfour and Dr. D. E. Anderson of Views, Photos, and Other Objects of Interest from Mauritius. 8.15 P.M., Paper by Dr. A. Balfour: A Medical and Sanitary Survey of Mauritius—Past, Present, and Future.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN, 17, Bloomsbury-square, W.C.
WEDNESDAY, Dec. 14th.—8 P.M., Prof. H. G. Greenish and Miss C. E. Pearson: Volatile Oils in Pills (communication from the Society's Research Laboratory). Mr. T. E. Wallis: Moths as Pests in the Pharmacy (Corcyra, Ephestia and Borkhausenia).

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.
MONDAY, Dec. 12th.—5 P.M., Dr. Scott Pinchin: Differential Diagnosis of Pulmonary Tuberculosis (2).
TUESDAY.—5 P.M., Mr. Page: Anæsthesia (2).
WEDNESDAY.—5 P.M., Dr. Grainger Stewart: Facial Palsies.
THURSDAY.—5 P.M., Mr. Bishop Harman: Senile Cataract.
FRIDAY.—5 P.M., Mr. Steadman: The Relation of Dental Sepsis to the Public Health.
Daily:—10 A.M., Visit of Post-graduates to Wards. 2 P.M., In-patient, Out-patient Clinics and Operations.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.
MONDAY, Dec. 12th.—4.30 P.M., Dr. J. Bright Bannister: Puerperal Sepsis.
TUESDAY.—3.30 P.M., Dr. F. G. Crookshank: Physical Examination of the Chest (4)—The Exploring Syringe.
FRIDAY.—3.30 P.M., Dr. T. H. C. Benians: The Laboratory Diagnosis of Tuberculosis in Children.
Daily:—2.30 P.M., In-patient, Out-patient Clinics, Operations, &c.

NATIONAL HOSPITAL FOR DISEASES OF THE HEART POST-GRADUATE COURSE, Westmoreland-street, Marylebone, W.
MONDAY, Dec. 12th.—5.30 P.M., Lecture:—Dr. R. O. Moon: Arterio-Sclerosis.
Daily:—10 A.M. and 2 P.M., Out-patients and In-patients.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY, Dec. 15th.—4 P.M., Lecture:—Dr. R. Hutchison: The Problem of the Solitary Child.

ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN, 49, Leicester-square, W.C.
THURSDAY, Dec. 15th.—6 P.M., Chesterfield Lecture: Dr. W. Knowsley Sibley: Acne.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE CLINIC.
TUESDAY, Dec. 13th.—4.30 P.M., Mr. P. R. Wrigley: Enlarged Prostates.

MANCHESTER FRENCH HOSPITAL POST-GRADUATE LECTURES, 24, Acomb-street, Whitworth Park.
THURSDAY, Dec. 15th.—4.30 P.M., Dr. N. C. Haring: Fluid in the Chest.

ST. MARY'S HOSPITALS POST-GRADUATE LECTURE, Whitworth-street West Branch, Manchester.
FRIDAY, Dec. 16th.—4.30 P.M., Dr. Ward: Treatment of Bronchial Affections in Children.

SALFORD ROYAL HOSPITAL.
THURSDAY, Dec. 15th.—4.30 P.M., Dr. C. C. Heywood: Thoracic Tuberculosis in Children.

UNIVERSITY OF SHEFFIELD—FACULTY OF MEDICINE. Post-Graduate Lectures and Demonstrations.
TUESDAY, Dec. 13th. (At the Royal Infirmary.)—3.30 P.M., Mr. J. Mouat: Complications of Traumatism. 4.15 P.M., Prof. J. B. Leathes: Nephritis.
FRIDAY. (At the Royal Hospital.)—3.30 P.M., Dr. E. F. Skinner: Neurosyphilis. 4.15 P.M., Dr. G. E. Mould: Classification of Mental Diseases.

BRITISH MEDICAL ASSOCIATION (North of England Branch).
FRIDAY, Dec. 16th. (At the Royal Victoria Infirmary, Newcastle-on-Tyne.)—2.15 P.M. to 5 P.M., Scientific Demonstrations.

Vacancies.

For further information refer to the advertisement columns.

All Saints Hospital for Genito-Urinary Diseases, Vauxhall Bridge-road.—Res. H.S. £160.
Ashton-under-Lyne District Infirmary.—H.S. £200.
Barry Accident and Surgical Hospital.—S. £750.
Bath, Royal United Hospital.—H.P. £180.
Birmingham Ear and Throat Hospital.—H.S. £200.
Birmingham, Ministry of Pensions Orthopædic Centre.—Jun. M.O. £350.
Birmingham, Queen's Hospital.—Obst. and Ophth. H.S. Each £90.
Bristol Royal Hospital for Sick Children, &c.—H.P. £150.
Bristol Royal Infirmary.—H.P. and H.S. £120 each. Ophth. Hon. Reg.
Bury Infirmary.—Jun. H.S. £150.
Cape Town University.—Sen. Lecturer in Physics. £450.
Cheadle, Barnes Convalescent Hospital.—Res. M.O. £300.
Cheadle, Cheshire, Cheadle Royal.—Asst. M.O.
City of Westminster Union Infirmary, 369, Fulham-road.—Sen. Asst. M.O. £350.
Coventry and Warwickshire Hospital.—Res. Jun. H.S. £200.
Govan District Asylum, Carewald, Glasgow.—Jun. Asst. M.O. £275.

Greenwich Metropolitan Borough.—M.O. for Maternity and Child Welfare. £650.
Harefield, Middlesex County Sanatorium.—Sen. Asst. Res. M.O. £450.
Herefordshire General Hospital.—H.S. £200.
Hospital for Consumption and Diseases of Chest, Brompton.—Anæsth. £100.
Johannesburg, University College.—Sen. Lect. in Anat. £516.
Leicester Royal Infirmary.—H.S.'s. £200.
Liverpool, Stanley Hospital.—Two H.S.'s. £120 each.
Loughborough and District General Hospital, &c.—Res. H.S. £200.
Macclesfield General Infirmary.—Sen. H.S. £180.
Maidstone, West Kent General Hospital.—H.S. £220.
Manchester, Baguley Sanatorium.—Med. Supt. £500.
Manchester City.—M.O. £450.
Manchester Royal Infirmary.—Asst. M.O. £35.
Manchester, St. Mary's Hospital for Women and Children.—Res. Obstet. Surg. £250.
Metropolitan Ear, Nose and Throat Hospital, Fitzroy-square.—Clin. Asst.
Middlesex Hospital, W.—Surg. Path. Reg. £350.
Middlesex Hospital Medical School.—Asst. to Prof. of Exper. Path. £350.
Mildmay Mission Hospital, Bethnal Green.—Non.-Res. Med. Supt. £400. Res. M.O. £120.
Mount Vernon Hospital for Tuberculosis, &c.—Anæsth.
National Hospital for Diseases of Heart, Westmoreland-street.—Res. M.O. £150.
Nottingham City Asylum.—Sec. Asst. M.O. £400.
Nottingham General Hospital.—H.S. £200.
Rochdale Infirmary and Dispensary.—Jun. H.S. £200.
Royal Free Hospital, Gray's Inn-road.—H.P. £50. Obstet. H.S. £50.
Royal Naval Medical Service.—Surg. Lieuts.
Royal Waterloo Hospital for Children and Women, Waterloo-road. Radiographer. £100.
Sheffield Royal Infirmary.—Cas. O. £150.
Southport General Infirmary.—Jun. H.S. £175.
Sunderland Royal Infirmary.—Path. and Bact. £300.
Ventnor, Royal National Hospital for Consumption.—Asst. Res. M.O. £300.
Walthamstow, Hospital for Infectious Diseases, Chingford.—Res. M.O. £325.
Western Ophthalmic Hospital, Marylebone-road.—Two Hon. Asst. Surgs.
West London Hospital, Hammersmith-road.—Two H.P.'s and one H.S. Each £100.
West Middlesex Hospital, Isleworth.—Asst. Med. Supt. £300.
Willesden Urban District Council.—Obstet. and Gynæcol. 100 guineas.

The Chief Inspector of Factories, Home Office, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Chirk, Menai Bridge, and at Chippenham.

The Home Secretary gives notice of a vacancy for a Medical Referee under the Workmen's Compensation Act, 1906, for the Margate and Ramsgate County Courts in Circuit No. 49. Applications for the post should be addressed to the Private Secretary, Home Office, and should reach him not later than Dec. 28th.

Births, Marriages, and Deaths.

BIRTHS.

PRIDHAM.—On Nov. 29th, at Hillfield, Broadway, Dorset, the wife of Dr. J. A. Pridham, M.C., of a daughter.
TROUP.—On Dec. 2nd, at "Morning Dawn," Cooden, the wife of Dr. W. Annandale Troup, M.C., of a son.

MARRIAGES.

COATS—HUTCHINSON.—On Dec. 1st, at St. John's Church, Paddington, Captain Douglas Hamilton Coats, R.A.M.C., to Eileen Constance, daughter of Lieut.-Col. F. H. G. Hutchinson, I.M.S.

DEATHS.

DOYLE.—On Nov. 28th, at 203, Coleherne-court, Lieut.-Col. Bernard Doyle, late I.M.S., aged 71 years.
HAINES.—On Nov. 30th, at his residence, 12, Old Court-mansions, Kensington, W., Charles Henry Haines, M.A., M.D., F.R.C.S.
HOGG.—On 3rd inst., at Ealing, Arthur John Hogg, M.R.C.S., F.R.C.P.E., in his 73rd year.
HUGO.—On Nov. 29th, after a short illness, at his residence, Richard Mandeville Hugo, M.D., F.R.C.S.I., in his 58th year.
MACQUEEN.—On Dec. 1st, suddenly, at Bolton House, Bolton-road, Eastbourne, Thomas MacQueen, M.B., C.M. Edin., aged 70 years.
MELDRUM.—On Nov. 10th, at 23, Montpelier, Hyde Park, Leeds, J. W. Meldrum, M.A., of the Leeds Central High School, dearly beloved husband of May I. T. Meldrum, M.B., D.P.H., Leeds Public Health Department.
ROSSITER.—On Nov. 27th, at Cairo Lodge, Weston-super-Mare, George Frederick Rossiter, M.B. Lond., M.R.C.S. Eng., aged 69 years.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Short Comments, and Answers to Correspondents.

DIETETICS AND PUBLIC HEALTH.[1]

BY PROF. E. C. VAN LEERSUM, M.D.,
DIRECTOR OF THE NETHERLANDS INSTITUTE OF NUTRITION, AMSTERDAM.

The Necessity of Systematic Propaganda in Nutrition of the People.

RATIONAL feeding is made difficult by the complexity of modern life. An actual shortage of food need not be feared in the near future, for although our resources are not inexhaustible, they will no doubt suffice for a very long time to come. If the estimations published by the late Sir William Crookes had been correct, we should now have begun to be aware of the shortage of wheat predicted by him; but, on the contrary, notwithstanding the rapid increase of population, production has proved sufficient to supply the needs of that part of it that is accustomed to eat bread. Moreover, a shortage of wheat would not mean an irremediable disaster; at the worst bread-eaters would have to reduce their ration of palatable white bread, but would then be no worse off than their forefathers who also used to take other materials besides wheat and rye to make their bread and cakes—viz., spelt, millet, barley, buckwheat, oats, rice, and even beans. All that is needed is technical improvements in baking, through which, sooner or later, a means will doubtless be found to render these kinds of flour, which owing to their smaller percentage of gluten are not yet used for the baking of aerated bread, fit for that use.

Without wishing to underrate the value of white bread as food for the Caucasian race, I do not believe that the food problem in general depends on it. Immeasurable stretches of land still lie fallow and wait to be cultivated in order considerably to increase the present production of grain and other foodstuffs, which has not nearly reached its maximum on the land already cultivated. There is no reason to fear that science will fall short of our expectations in the direction of agriculture. But pessimistic prophecies like that of Prof. Crookes have at least this advantage, that they rouse men and set them to work to avert the foretold disaster.

International Trade in Foodstuffs.

The rise in price of many foodstuffs is by some people wrongly regarded as a sign that dearth is coming: this dearness is really attributable to other causes. If in fertile Holland tree-fruit has become so dear that the poorer part of the population have to go without it, it is not because of a shortage of fruit or of orchards, but rather because of the operations of trade—i.e., the finding of more profitable markets elsewhere. Many foreign and overseas foods have become indispensable to us, so that we should have to rack our brains to compose a meal of nothing but home products. Not to speak of tea from Ceylon and Java, coffee from Brazil, and cacao from the West Indies, our breakfast bread is baked of flour from Canada or the United States; our bacon or ham have, I daresay, been supplied by Swift or another of the big five; our beef has probably been imported from the Argentine, our mutton from Australia—or if not, our cattle have most likely been fattened with Argentine linseed meal and North American maize. As for cake, the confectioner is not likely to have made it with expensive home eggs, for China can supply him with much cheaper dried white and yolk. And the artificial butter which he has used finds its origin in the fat of American cattle or in the palm seeds or cocoa-nuts from tropical regions. Now, if we still lived in the primitive state of Nature we might allow instinct to guide us, as it did successfully when dietetics were unknown: but in our present society this instinct has no chance to develop and can no longer serve us. We are bound by social circumstances which do violence to our Nature; the obstacles in the way of rational feeding are partly economic, but are also found in ignorance, false notions, prejudice, intemperance. The war emphasised what we knew partially before through scientific experiments—that we can do with much less food than we thought we could; but that lesson is already forgotten again, and most people eat to their hearts' content, without bothering about economy or health.

Prejudice in Diet.

Meat is the most desirable food in the eyes of the poorer classes, and in many a workman's household more is spent on meat than the income justifies; the North American workman is not satisfied unless he has meat on his table twice or three times a day, though he might very well do with it

[1] Being a Chadwick lecture given at the Barnes Hall, Royal Society of Medicine, on Nov. 24th.

once, without harm to his health or working-power. Another example of the working of prejudice is the fact that even in London one would have great difficulty in finding a grocer's shop where brown rice could be obtained. Rice-polishing owes its rise to the unwarrantable preference of the public for beautiful white rice. The rice-huller, as a good man of business, trades on this preference, the more so as he knows what to do with the bran. In polishing the rice he deprives it of the silverskin or pericarp—he calls this *refining* it—which, as experience in the tropics has taught us, prevents the outbreak of the much-feared beri-beri. Again, the so-called hard spring wheat is, for more than one reason, preferable to the soft variety, but is so hard and brittle that the husk breaks in little particles, which cannot be separated from the flour by sifting. The dark meal produced dark-coloured bread, which was not wanted because of the popular preference for very white bread; the hard wheat apparently had no future in front of it—it did not fetch its price, and the flat market in its turn depreciated the value of land specially fit for culture of hard wheat. This incited technicists to improve the methods of grinding; mills were made with steel rollers, with which it was possible to get pure white flour from hard wheat also; although it was inferior in nutritive quality to the dark flour, it found a ready market. It goes without saying that much advantage is taken of these public preferences. To please the eye of the consumer manufacturers have begun bleaching meal by chemical means which are not above suspicion. Those familiar with the history of popular nutrition know how obstinately the people will resist new articles of food. It has taken the potato a couple of centuries to secure a permanent place on the table of the people; at present they are so much attached to it that, during the war, people—in Holland at least—preferred bad potatoes to good peas and beans. The indigent population of the occupied regions of Belgium refused to eat the maize of the Relief Committee because they considered it an inferior food, fit only for cattle. In Holland, where the price of meat is extremely high, it is exceedingly difficult to persuade the public to eat the much cheaper, and at least equally nourishing, chilled or frozen Argentine meat.

The question of the quality of food has become much more urgent than the question of quantity; it has frequently been pointed out by such men as Liebig, G. J. Mulder, Donders, Voit, Rubner, that nutrition of the people is a Government concern, but it cannot be said that their warning voice has found much response in their Governments. It seems that catastrophes such as famine or war are necessary to open the eyes of those who are set above us. Under the pressure of the world-war, scientific bodies have been formed, as in England the Food Investigation Board, in the United States the National Research Council, in the Netherlands the Committee of People's Welfare and the Netherland Institute of Nutrition, whose task it is to solve, with the assistance of science, the most urgent problems of society, and in the first place that of nutrition. This is a great step forward. Let us hope that the Governments will also make it possible for these bodies to subsist in times of peace.

Propagandist Measures.

In the United States, for many years past, a propaganda has been carried on by the State and by private people which may, in many respects, serve as an example to Europe. Nowhere, except in Germany, are found so many scientific investigators who serve industry; the practical sense of the people is reflected in the work of its scientists upon problems, the solution of which promises direct profit. This explains why such men as Armsby, Francis Benedict, McCollum, Graham Lusk, Lafayette Mendel, and Thomas Osborne have worked in the field of dietetics.

It would be easy to fill a volume with the enumeration and description of the ways in which, in the United States, propaganda is made for rational feeding. It moves in all directions, and uses means which are still too new for us, but which, for their efficiency, deserve our full attention. Popular scientific literature, the means to which we restrict ourselves in Europe, is used in the United States on a very much larger scale than with us for the purposes of propaganda. Government institutions—e.g., the Department of Agriculture, under which fall the Office of Home Economics, the Bureau of Fisheries, and the Bureau of Markets—distribute gratis or for a small sum, quantities of illustrated pamphlets written by experts, on the most important subjects of agriculture, stockbreeding, home economics, markets, trade, and industry. Charitable societies also do much in this way. Large industrial bodies and companies follow suit, their own interests being best served by the enlightenment of the public. The duties of the 11,000 agents of the Metropolitan Life Insurance Company include the distribution of popular hygienic publications, for which the company has started a printing office of its own. But though this work is very useful, it is by no means considered sufficient because it does not reach all the groups of society, but only those who are susceptible to reason and who are more cultured. The majority take more delight in bioscopes and detective stories.

The North American is much freer in the choice of his means of propaganda than we, who are more careful to observe the proprieties from an exaggerated fear of making ourselves ridiculous. A master of advertisement, he is never at a loss to find a catching phrase, a slogan, to rouse enthusiasm. What would be said in Europe of a clown coming to a school to entertain the children with jokes on the drawbacks of eating sweets and the advantage of drinking milk? Or to a fancy-dress procession in the public streets in the manner of the Boys' Loyalty Parade, recently held in New York, in which "Good Old Milk Bottle" drove before him Teapot and Coffee-pot, the two thieves of children's health, and in which marched a group of useful vegetables—Charlie Carrot, Bill Beet, &c. Such a show, however absurd it may seem, makes a deeper impression than many a learned demonstration, to which, for that matter, the man and the woman and child in the street would not come to listen.

A favourite means of propaganda in the United States is the poster, which has come up to a high standard as regards expression and suggestion.

Club Work among Young People.

In the United States many boys and girls between the ages of 10 and 18 wear a badge, representing a four-leaved clover on which are four H's, and indicating membership of a boys' or girls' club and willingness to work with Hand, Head, and Heart for Health. This quite American organisation of boys' and girls' clubs is a proof of public spirit, insight, and education, organising talent, and enthusiasm. The Smith-Lever Law has in view the giving of useful advice and helpful information to the population on agricultural and domestic affairs; the authorities could hardly have found more diligent and willing assistants for their propaganda than among the young, who, still unprejudiced, learn while they play, and like to imitate the work of their elders. This inborn tendency of children the States Relation Service, a subdivision of the Department of Agriculture, has turned to account, of course in concert and collaboration with the school authorities, and has attained results of great importance to the State and to the family. The Extension Service works among the young, through club leaders, home demonstrators, and specialists in various agricultural and domestic industries, who promote the starting of clubs, the members of which apply themselves, under their guidance, to the cultivation of useful plants, the breeding of cattle and fowls, to fruit-preserving, cooking, domestic work, &c., on a small scale and in accordance with local requirements. It is stated in the 1918 report, by the director of the States Relation Service, Mr. A. C. True, that club work has produced 825,000 bushels of maize, 680,000 bushels of potatoes, 2,000,000 quarts of preserved food, 1,922,300 fowls, 908,900 dozen eggs, 821,000 lb. of meat, 1,668,900 lb. of cotton, not to speak of other products, such as jelly, peanuts, sorghum, wheat, and beans. The greater part of this produce has been used for domestic purposes, and has saved much outlay in the first necessaries of life; no small part of it has yielded immediate profit. I shall not tire you with specific instances, but will only say that the gain has enabled many a one to defray his college expenses. Nor should the indirect advantage of club work be rated low, for the profit gained cannot but impress the older people: their attention is drawn to new and improved methods.

I hope you will not suspect me of imagining that American club work is fit for wholesale transplantation to our own continent. The difference in economic circumstances between the Old World and the New is too great for this. Where, for instance, would one find in our densely populated countries so many pieces of fallow land, fit to be made a loan of to boys' and girls' clubs? But though an unconsidered imitation of the North-American institution of boys' and girls' clubs is out of the question, I believe that much good may be done by introducing it on a small scale.

The Transplantable Dietician.

The calling of the dietician might be transplanted to our European society without much alteration, and would greatly benefit the cause of feeding the people. The recent development of work for the improvement of defective social conditions has not hitherto included propaganda for rational feeding—chiefly owing to the fact that there are no experts who could be entrusted with this work. In North America dieticians have existed for years, and anyone who has seen them at work there asks himself how it is possible that, up to now, we in Europe have had to do without their good services. The work of dieticians cannot be described in a single word, for several categories must be distinguished—categories of medical dietetics, domestic economy, poor relief, charity; in short, wherever problems of feeding wait for solution.

I first made the acquaintance of the dietician in Battle Creek Sanitarium, the largest of the kind of the United States and probably of the world, where thousands of more

or less serious cases are treated yearly according to physical and dietetic methods. The entire care of the patient's food (complicated in this instance by adherence to vegetarian principles) has there been given into the hands of persons properly instructed in the science of foodstuffs, of digestion and metabolism, and in general and medical dietetics. When I visited Battle Creek I found there no fewer than six dieticians, two of whom were exclusively charged with the supervision of the diabetes kitchen; the latter were—as I had an opportunity of ascertaining—quite equal to this task. At present in most American hospitals of any standing, dieticians are employed, to the great satisfaction of the boards—who make an appreciable financial profit out of this work—of the medical staff, whose task is considerably lightened, and, last but not least, of the patients.

In Europe the problem of feeding in the hospitals has, in spite of its importance, not yet received much attention; the matrons, controllers, administrators, and cooks, to whose care it has been entrusted, are not experts, at best they are amateurs as regards feeding and hospital cooking, while the physician is too much taken up by his professional cares to be always able to supervise the carrying out of his dietetic prescriptions. Why not put an end to this unpractical state of affairs by ensuring the execution of these prescriptions in a way similar to that long since taken with regard to medical prescriptions? That such a course can also be successfully followed in the execution of dietetic prescriptions has been proved by experience in North America. To begin with the scientifically trained and responsible dietician keeps a watchful eye on the quality of the food bought and sees that the preparation of it takes place according to the laws of cookery. In special cases she takes charge herself in kitchens specially designed for the purpose; accompanying the doctor when he visits the patients, she notes down his directions concerning their diet and works out the menus, observing the quantity and quality desired, the proportion of calories, at the same time taking into consideration the particular desires of the patients—for instance, ritual prescriptions, &c. She supervises the preparation and the distribution of the food, finds out how much has been taken, takes note of its effect by means of weighing, examination of excreta, if necessary quantitative test for sugar, and regularly reports the results to the doctor.

"Out-patient Diet."

Outside the hospital, also, sick people can avail themselves of the services of the dietician. Every doctor knows how difficult it is, even where money is no obstacle, to get the more intricate dietetic prescriptions properly carried out. The housewife may do her best, but as a rule a diabetes menu is beyond her powers, partly because she has no idea of the protein, carbohydrates, and fat-content of the ordinary and of the so-called diabetes foodstuffs, partly because the preparation of the food that the patient is permitted to have is too difficult and troublesome.

How far the measures taken by many North-American firms to promote the nourishment of their officials and workmen might be imitated in Europe I dare not decide. In many cases these companies try to accomplish this purpose by giving nourishing and cheap, even free, lunches, to their employees in private lunchrooms and "cafeterias," where they avail themselves of the advice and services of dieticians; but though, in principle, measures of this kind deserve to be applauded, it depends on the financial strength of a business whether there is a possibility of carrying them out.

Training of the Dietician.

This training comprises an extensive curriculum, a prominent place being given to natural sciences, physics, chemistry, botany, and zoology, these being the foundation of the science of foodstuffs, dietetics and metabolism, domestic economy, cookery, and general and special dietetics. The dietician should be not merely a speaking-trumpet, but an expert, who can judge independently, can criticise, and follow the course of dietetics. Intelligence, general education, refinement, and knowledge of men are necessary to ensure for the woman taking up this profession, the necessary moral ascendancy over the less cultured among whom she will have to move; she also requires philanthropy, devotion, and a sense of duty. No more remarkable thing struck me in the United States than the work of the dieticians in the slums. I was allowed to accompany them on their home-visiting, and could admire the tact with which they contrived to win the mothers and to conquer the shyness of the ragged children. There are no better means of convincing the mothers of the utility of milk and other nourishing food and the harmfulness of bad sweets than a rising curve of bodily strength and weight. I have been present at nutrition classes where mothers and children met to have the necessary knowledge inculcated by practical demonstrations. I remember with pleasure such a meeting held in an empty shop in the densely populated Amsterdam Avenue. One of the dieticians began with a chat on some questions of nutrition—giving, for instance, a graphic illustration of the difference in nutritive value of coffee and milk. Then she treated the subject of soup and pointed out the nutritive value of peas and beans; at the end of her pleasant and instructive demonstration we all received a paper mug of bean soup. Then a little poem was written on the blackboard and the audience was asked to sing it. We all sang at the top of our voices to the accompaniment of a guitar:—

Here's to your good health and mine,
When short in milk, pea-soup is fine,
It's hot and good at noon or night,
Makes muscles strong and faces bright.

Finally the charts were examined on which had been traced the weight-curves of the children and on which some of the children themselves had noted down some hygienic measures. Then the marks of distinction were awarded—coloured paper stars which were pasted on the charts; it was all very simple, even naïve, but all the more effective. To this the faces of the mothers and children bore evidence when the lesson was over.

In conclusion, if I have claimed your attention for a moment for so self-evident and prosaic a thing as nutrition, I have done so for the simple reason that it is the corner-stone of the life and strength of the nation.

We may live without poetry, music and art,
We may live without conscience, and live without heart,
We may live without friends, we may live without books,
But civilised man cannot live without cooks.
He may live without books, what is knowledge but grieving?
He may live without hope, what is hope but deceiving?
He may live without love, what is passion but pining?
But where is the man that can live without dining?

EGYPT AND THE SOUDAN:
HEALTH AND SANITATION.

II.—SOUDAN.

THE following completes the summary of the report of Field-Marshal Lord Allenby on the affairs of Egypt and the Soudan for the year 1920.

Soudan Administration.

Turning to the Soudan, the High Commissioner forwards a report from Major-General Sir Lee Stack (Governor-General) on the administration and condition of that country. Under the heading "Public Health," Sir Lee Stack writes that the most important feature has been the severe outbreak of small-pox in the southern provinces — Babr-el-Ghazal, Mongolla, Upper Nile, and Nuba Mountains—during the winter 1919–20. The natives of these provinces are not well vaccinated, and in consequence the disease spread rapidly and the mortality was high. Effective steps were taken to prevent its spread north. A small outbreak occurred also in the Berber province, traced to a man from Omdurman where no cases were known.

An epidemic of influenza occurred in the Kassala province early in 1920, but the type was mild. Cerebro-spinal meningitis broke out in Western Mongolla with a heavy mortality. Diphtheria was more than usually prevalent in Khartoum and Atbara. Malaria was very prevalent owing to the heavy rains.

The Midwives' Training College at Omdurman is completed and work will be commenced there shortly. A site for a leper colony has been found up the Atbara, and it is hoped funds will be available for building there. The cost of administration has been considerably increased, as, apart from the increase of pay granted to all personnel, the price of materials shows little tendency to fall. Drugs, instruments, bedding, &c., are all at least double pre-war price. Such common drugs as quinine and Epsom salts have risen to four times their former price. Doctors have been difficult to obtain, and though the establishment of medical inspectors has been completed, it has not been found possible to fill the establishment of medical officers. The formation from trained native hospital attendants of a staff of assistant medical officers has proved of considerable value and helped to meet the deficiency of doctors.

The recorded births in 1919–20 were 23,793 as against 23,033 in 1918–19, and the recorded deaths were 17,835, against 22,255. These figures, so far as they can be accepted as correct, are satisfactory, the births showing an increase of 760 and the deaths a decrease of 4420. 156,378 vaccinations were performed. Out-patient attendances in the civil and military hospital show a net increase of 8890 and in-patient of 1111.

Medical Examination of Labourers.

It has been considered necessary to enforce a more rigid examination of labourers from Upper Egypt before their entry into the Soudan. This is being carried out at Halfa and involves detention in the quarantine camp there for a period of three days; 100 to 150 men daily, or between 600 and 900 a week, are medically examined, shaved, bathed, disinfected, and treated with some vermifuge. The percentage up to date found infected with ankylostomiasis is

much lower than was anticipated, and the degree of infection, estimated by the number of worms removed, less. The cases of ankylostomiasis allowed in the Soudan will receive further treatment at their working destination. On the other hand, the percentage of bilharziasis is very much higher, and if all cases were rejected recruiting of Said labour would be an impracticable proposition. For this reason, and taking into consideration that bilharziasis is already very widely distributed throughout the Soudan, it has been decided to reject only severe cases of this disease and to allow others to be employed on the Gezira works until the canal system is much further advanced than at present, when the risk of spreading infection will be increased and the question will have to receive further consideration.

The parts of the country affected by sleeping sickness are Western Mongolla and Southern Bahr-el-Ghazal. In the former the campaign against the sickness has been in progress some ten years. Its general situation can best be described by saying that the disease is under control. During the time the restrictions of quarantine, &c., have been in force a marked improvement has taken place. In the Southern Bahr-el-Ghazal the work has been in progress for not more than about three years. Latterly the death of Captain A. Watson, D.S.O., R.A.M.C., has left the district with only one medical officer. A new camp has been formed near the French equatorial frontier. It seems to be the case that the system of segregation in practice in Western Mongolla is likely to prove the best method of ultimately eradicating the disease from the Soudan.

LICENSED BIOLOGICAL PRODUCTS IN U.S.A.

IN July, 1902, Congress approved "An Act to regulate the sale of viruses, serums, toxins, and analogous products in the District of Columbia, to regulate interstate traffic in said articles, and for other purposes." *Public Health Reports* for Oct. 14th contains a list of the establishments holding licences issued by the Treasury Department in accordance with this Act. The list is as follows:—

Parke, Davis and Co., Detroit, Mich.; H. K. Mulford Co., Philadelphia, Pa.; Slee Laboratories, Surftwater, Pa.; the Cutter Laboratory, Berkeley, Calif.; Bureau of Laboratories, Department of Health, New York City; Lederle Antitoxin Laboratories, Pearl River, N.Y.; Bacterio-Therapeutic Laboratory, Asheville, N.C.; Dr. G. H. Sherman, East Jefferson-avenue, Detroit, Mich.; Hygienic Laboratory, California State Board of Health, Berkeley, Calif.; the Abbott Laboratories, 4735, East Ravenswood-avenue, Chicago, Ill.; Beebe Laboratories, St. Paul, Minn.; Dr. W. T. McDougall, 640, Minnesota-avenue, Kansas City, Kans.; St. Louis Pasteur Institute, 3514, Lucas-avenue, St. Louis, Mo.; the Upjohn Co., Kalamazoo, Mich.; E. R. Squibb and Sons' Research and Biological Laboratories, New Brunswick, N.J.; Laboratory of Clinical Pathology, 1208, Wyandotte-street, Kansas City, Mo.; Dr. James McI. Phillips, 2057, North High-street, Columbus, Ohio; Eli Lilly and Co., Indianapolis, Ind.; Swan Myers Co., 219, North Senate-avenue, Indianapolis, Ind.; Gilliland Laboratories, Ambler, Pa.; Antitoxin and Vaccine Laboratory, Department of Public Health, Commonwealth of Massachusetts, Forest Hills, Boston 30, Mass.; United States Standard Products Co., Woodworth, Wis.; D. L. Harris Laboratories, Metropolitan Building, St. Louis, Mo.; the Arlington Chemical Co., Yonkers, N.Y.; Dermatological Research Laboratories, Philadelphia, Pa.; H. A. Metz Laboratories, 122, Hudson-street, New York City; Synthetic Drugs and Diarsenol Laboratories, Buffalo, N.Y.; Hynson, Westcott, and Dunning, Baltimore, Md.; Mallinckrodt Chemical Works, St. Louis, Mo.; Empire State Chemical Laboratories, Brooklyn, N.Y.

Seven foreign establishments also appear on this list. In some cases the licence is issued for a single product—e.g., arsphenamine or rabies vaccine: in others, for 50 preparations or more. One of the longer enumerations is the following:—

Diphtheria antitoxin; tetanus antitoxin; perfringens antitoxin; antianthrax serum; antidysenteric serum; antigonococcic serum; antimelitensis serum; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; normal horse serum; vaccine virus; rabies vaccine; tuberculin old; tuberculin T.R.; tuberculin B.E.; tuberculin B.F.; tuberculin proteose-free (Lyons); bacterial vaccines made from acne bacillus, cholera vibrio, colon bacillus, dysentery bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, micrococcus melitensis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, plague bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; sensitised bacterial vaccines made from acne bacillus, cholera vibrio, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus, diphtheria toxin-antitoxin mixture; pollen extract.

The licences granted do not imply an indorsement of the claims made by the manufacturers for their preparations. The granting of a licence means that inspections of the establishment concerned and laboratory examinations of samples of its products are made regularly to ensure the observance of safe methods of manufacture, to ascertain freedom from contamination, and to determine the potency of diphtheria antitoxin, tetanus antitoxin, antidysenteric serum, antimeningococcic serum, antipneumococcic serum, bacterial vaccines, prepared from typhoid bacillus, paratyphoid bacillus A, paratyphoid bacillus B, and diphtheria toxin-antitoxin mixture, the only products for which potency standards or tests have been established.

CYNOTHERAPY.

To the Editor of THE LANCET.

SIR,—In your issue of Nov. 26th under this heading a correspondent gives a recipe for dog oil copied from Pharmacopœia Londinensis, 1659, containing in its ingredients "sallet oyl, two puppy dogs newly whelped, earth worms washed in white wine, and cypress turpentine and spirit of wine."

It is interesting to compare this with the following copied from "Confessio Medici,"[1] quoting from writings of Ambroise Paré about 1540. "When I was at Turin I found a surgeon famed above all the rest for his treatment of gunshot wounds; into whose favour I found a way to insinuate myself, that I might have the recipe of his balm as he called it, wherewith he dressed these wounds. And he made me pay my court to him for two years, before I could possibly get the recipe out of him. In the end, thanks to my gifts and presents, he gave it to me, which was this, to boil down, in oil of lilies, young whelps just born, and earthworms prepared with Venice turpentine. Then was I joyful and my heart made glad, that I had learned his remedy."

I am, Sir, yours faithfully,

EDGAR J. TYRRELL.

Pope's Head Alley, Cornhill, E.C. 3, Dec. 3rd, 1921.

NEWSPAPER INSURANCE.

FOR some time past various newspapers have offered advantages to their readers in the way of insurance against railway accidents and other sudden and expensive calamities. As far as we remember the practice began with the promise of a sum of money to the representatives of a person found dead after a railway accident with a copy of a particular publication in his pocket. This, however, was obviously not an inducement to subscribe regularly, and there was no certainty that the person who bought the paper and met with an accident would so dispose of it that he could be identified with it, and his dependents enabled to make a claim. The insurance now offered usually takes the form of an order given to the newsvendor (who himself receives a commission when any compensation is paid) combined with the registration of the subscriber's name by the newspaper. The benefits promised have also been largely increased. A single subscription in at least one instance secures advantages to a husband and his wife. The accidents insured against include many varieties besides those encountered when travelling by rail or motor-car. Even accidents in the home or in the football field can be provided against.

We do not criticise or inquire into the soundness of such schemes from the actuary's point of view. The newspaper deliberately adopts an expensive, but no doubt also an effective, means of advertising itself and of increasing its circulation. The subscriber benefits by such perfectly legitimate enterprise. If he has no special preference for a particular journal as "mental pabulum" he no doubt will be careful to choose the one that offers him the greater advantages, taking account of the ordinary risks to which he and his wife are subject. Medical men who are witnesses of the strain put upon the finances of their less wealthy patients when an accident occurs should be first to commend an inexpensive method for meeting it. Medical men themselves encounter not only the ordinary risks of citizens, but others more or less incidental to their calling. They also, and their families, belong to the class to which the reading of a daily newspaper is practically a necessity of life.

There is another class of insurance which newspapers might well offer, either as an alternative to or jointly with other risks. We refer to that which the National Provident Scheme for Hospital and Additional Medical Services is designed to provide for persons whose incomes do not exceed £500 per annum. At a meeting to consider the National Provident Scheme held by the British Medical Association, Marylebone division, Dr. A. Cox expressed a preference for a "straightforward insurance scheme." Such a scheme might well include persons of all classes and incomes who, in the case of serious illness or operation, would receive compensation or contribution based upon the reasonable expenses of their treatment and proportionate to the premiums paid. It would not, of course, in the case of those not treated in voluntary hospitals, have any effect upon hospital finance, but would be the concern of the lay public and the actuaries. The newspapers, having insurance schemes, would be able to take such part as they found to be consistent with their objects and interests.

[1] Confessio Medici. By the writer of the Young People. Macmillan. 1908.

MILK—NOT FOR ANALYSIS.

ON Nov. 3rd a Brighton dairyman was fined £5 on each of two summonses: (1) for refusing to sell milk to an inspector, and (2) for obstructing the officer in the course of his duties. Rather than supply the inspector with a sample of milk for analysis defendant overturned his cart, and a churn full of milk ran down the gutter. The magistrates refused to believe that this was an accident. The dairyman successfully evaded inquiries from the bench about his alleged remark that the milk was sour and that he was "taking it up the side streets to get rid of it." The district where the inspector met defendant with the milk is the poorest in Brighton, and the result of an examination of its quality would have been of interest.

COLLAPSIBLE DOUCHING APPARATUS.

MANY patients who are taught to irrigate themselves complain of the difficulty of concealing the necessary apparatus, especially in taking it from their bedroom to the bathroom, without disclosing a bulky parcel. Dr. A. Allport has devised a collapsible vessel made of rubber which will fold up and go into the pocket, and which can be extended and made rigid by means of a vulcanite stay or prop. It is graduated inside up to two pints and is worked on the syphon principle, the syphonage being started by a rubber suction bulb. This bulb may be fitted to the lanet's nozzle, together with the rubber shield, and used as a hand syringe if required. The makers are Messrs. W. G. Holman, Beauchamp-place, Brompton-road, S.W. 3.

COLLECTING ANTIQUES.

THE narrative of a 25-years' search for antique furniture, prints, china, paintings, and other works of art cannot fail to find an appreciative public among those who themselves have made collections or who are about to start on this fascinating pursuit. Mr. Felix Gade, in a book entitled Collecting Antiques for Pleasure and Profit,[1] writes with infectious zest of seventeenth-century lacquer and marquetry, of twist-leg furniture and gate tables, Cromwellian chairs, and oak chests; deals briefly but adequately with Queen Anne furniture and the Chippendale, Hepplewhite, and Sheraton periods; and then digresses pleasantly on the miscellaneous extras—old clocks, decorative needlework, rugs, carpets, and engravings. He adds to much valuable advice some amusing gossip, and a list of prices recently paid for works of art in good condition concludes the volume.

LECLANCHÉ CELLS.

WE have received from Messrs. Siemens Bros. a set of catalogues containing illustrations and descriptions of various types of Leclanché cells. This firm has paid much heed to the construction of these cells, and many improvements have been effected in details of design. They have been constructed in many different sizes, both in the wet and dry form, and batteries can be obtained which will yield currents suitable for various purposes. The medical practitioner will be more interested in those which have been designed for the production of current for direct application to the body, as for ionic medication. Dry cells form an important source of current for those who require portable apparatus for the treatment mentioned, and they are extensively used. There is no reason why wet Leclanché cells should not be used by those who have no access to the direct main current. In the absence of a main supply, wet cells are preferable to dry cells when portability is not essential, and a battery of 40 could be permanently installed. If water is added occasionally to replace that lost by evaporation, and some sal ammoniac supplied from time to time, these cells will last for years. The zinc rod which slowly dissolves can be replaced, but this need be done only at long intervals. There is one special advantage which accompanies the use of cells for the production of current for direct application to the body. The current from cells is a true constant current, while that obtained from the direct current dynamo, which provides current on the main, is not absolutely constant, but slightly undulatory. The current from small dynamos is still more undulatory, and when a strong current has to be applied to the body, it is more readily tolerated if it is derived from cells. When the dynamo is used as a source of the current, the fine undulations are quickly perceived by the patient and cause disagreeable sensation when the current is much increased. Indeed, in a recent work on Medical Electricity, by Delherm and Laquerrière, the authors insist on the necessity of the use of the current from cells or accumulators for the treatment of neuralgia. They state that if the direct current from the main is used, the patient's tolerance will be overstepped before a current strong enough to procure relief can be applied. They ascribe failure to obtain relief to the use of currents which are insufficiently strong, and they show that a current of the requisite intensity cannot be tolerated if it is obtained from a dynamo. In the early days of the Electrical Department at St. Bartholomew's Hospital, before a main supply was available, the constant current was derived from wet Leclanché cells. There were three batteries, each containing 50 cells.

Messrs. Siemens's catalogues will be interesting to the practitioner of electro-therapeutics. They are well prepared and copiously illustrated.

[1] London: T. Werner Laurie. 1921. Pp. 222. 86 plates. 18s.

A DEFINITION OF FINE CHEMICAL.

THE answer to the question, What is a "Fine Chemical?" is given by Mr. C. A. Hill, B.Sc., F.I.C., in a paper appearing in the *Journal of the Society of Chemical Industry* for Nov. 30th. The term used to be employed loosely, sometimes to signify synthetic organic substances, sometimes analytical reagents or research chemicals, and frequently in a sense more vague than either of these. The Safeguarding of Industries Act has raised the necessity of deciding definitely whether a given chemical product is or is not a fine chemical. In deciding the point, all the attributes of chemicals have to be considered: scale of manufacture; conditions of manufacture; skilled labour; highly skilled supervision; rarity; high cost; high grade of purity; and freedom from impurities. Each of these ideas contributes something to a general understanding of what fine chemicals are. But the real crux is the idea that the chemical is to be put to some specific use and for that purpose must conform to some definite standard of purity. The shortest description of a fine chemical which is in any way adequate is that it is a chemical, not produced as a "heavy" chemical, which is of specified purity for a specific purpose.

A DISCLAIMER.

To the Editor of THE LANCET.

SIR,—It has just been brought to my notice that my name was mentioned in a Sunday paper last week in regard to the case of a boy who had been seen by Pastor Jeffreys at Notting Hill. I need hardly state that I was quite ignorant of the fact that my name was to be published and I never gave any permission for it to be used in any way. I should be much obliged if you could kindly find room to insert this letter in your journal.

I am, Sir, yours faithfully,
Wimpole-street, W., Dec. 3rd, 1921. GEORGE N. BIGGS.

SUCCESSFUL QUACKERY.

To the Editor of THE LANCET.

SIR,—When I was in Australia some 30 years ago a certain notorious "herbalist" in Sydney, N.S.W., was prosecuted for practising without a diploma and for obtaining money by false pretences. He had an enormous practice and the medical faculty were, very naturally, indignant about it. But when summoned, the man was able to produce incontrovertible evidence that he was a duly qualified medical man. The account he gave of himself was as follows:—

"When I started practice as a doctor, I hardly ever got a patient, but I saw several 'herbalists' and unqualified men doing an enormous and lucrative business. So, in desperation, I determined to follow their methods, with what success you know. The ignorant public here will pay handsomely for quackery and imposture, but are niggardly towards genuine medical work."

I fear that Sydney is by no means the only place where this is so, and until our more ignorant portion of the population is elevated from their present condition of stupidity there will always be an opening for the humbug, the impostor, and the quack.—I am, Sir, yours faithfully,

F. A. PARKER, M.A. Cantab.
Carnforth, Lancs, Dec. 2nd, 1921.

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